Tiffany A. Hayes. Reference Services Go High-Tech: Best Practices in Connecting College Students and Librarians. A Master's Paper for the M.S. in L.S degree. April 2005. 39 pages. Advisor: Dr. David Carr

This exploratory study looks at the organization and content of academic library web

sites to see how libraries are incorporating digital services into their reference programs.

The object is to find out not only what services are being offered by libraries, but also

how those services are structured into the web site.   The data analysis includes

descriptions of academic library web sites and their strengths and weaknesses in

providing accessible, useful reference services to undergraduate students.

Headings:

Reference Services – Academic Libraries
Digital Reference
Undergraduate Libraries – Web Sites

REFERENCE SERVICES GO HIGH-TECH: BEST PRACTICES IN CONNECTING
COLLEGE STUDENTS AND LIBRARIANS

by
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Introduction

Imagine this scene: you're a college student who has just realized that big paper is due tomorrow, and you need just a few more good sources. It is late evening, and perhaps also raining in torrents. You trudge to the library and arrive soaking wet and cold. The interior of the library is gloomy and so dimly lit that you can almost not see to read. The books are shelved in a disorderly fashion, and you can't find the one you need. When you approach the reference desk, the librarian responds in a grumpy and unhelpful manner—which is explained when you realize this person is no librarian at all, but the night custodian, reading a book behind the desk. You go home empty-handed, fail the class, and live unhappily ever after.

Or, upon realizing that you need those few more sources, that one crucial book, instead of going to the library you simply rub the magic lamp, and Poof! out comes the Library Genie.

"How may I serve you?" he asks.

"I need scholarly comparisons of *Lysistrata* and *A Doll's House* for my drama paper," you say. "And can you help me with the citations, too?"

"Your wish is my command," says Library Genie. And with another Poof! the desired documents appear on your desk.

Clearly, the second scenario is how most undergrads would like to do research, while the first is how many of them view a trip to the library. And while academic

librarianship has not quite reached the level of service in this ideal example, it should bear little or no relation to the first scenario, either. But what makes that library nightmare so awful, and what makes the library fantasy so appealing? The difference

between them involves four components: aesthetics, comfort, organization, and service. These components matter to both physical and online library features. Since the rise of the digital library, some people have considered online resources to be almost a "library genie" that magically does all the work and makes the physical building and the actual librarians obsolete. In fact, these elements of library service have not grown less important, but have simply changed to encompass the new capabilities of digitization. In this transition period from a primarily physical collection to an increasing level of online information, the relationship between the two remains a matter of debate, as well as some trial and error. It is possible to have a lovely physical library but a horrible web site, or to have a wonderful web site but an awful library facility, or to have perfectly fine digital and physical components which nonetheless complement one another poorly. The initial example of the nightmare library represented ething that can go wrong: a dark and inhospitable setting, disorganized resources, and unhelpful reference services (or none at all). All of these problems can exist online as well. And the perfect fantasy library has all the best qualities of a library: the comfort of one's own home, ease of access, and the prompt and thorough service that good reference librarians strive to deliver online or in person.

In short, people make a big fuss over whether digital libraries are better or more useful than physical libraries, when in fact they are not two different entities but elements of the same thing, each with strengths and weaknesses. The really relevant question is,

what are libraries doing to improve themselves while expanding into the digital world? Specific to reference services, how are academic libraries and librarians helping to connect students with information? Reference librarians have shifted their services into the digital realm in reaction to new technologies which help them do their jobs better, as well as an increasingly tech-savvy patron base. The web sites of academic libraries are a tool for the support of this shift, but many of the same principles still apply. Patrons want quick service and easy access to resources in a comfortable and non-threatening atmosphere. Librarians should consider web sites and digital tools as parameters surrounding and defining their work space, much the same way they would view the physical building. This research will examine academic library web sites to see how they provide reference services in the digital realm, with the theory that new digital tools do not replace the service aspect of librarianship but instead help librarians respond to students' increasingly complex information needs. According to Barbara Dewey, a respondent to her 1999 survey of university library web sites said that "its Web redesign was part of a larger intellectual effort to aid in resource discovery and selection through reconceptualization of information zones or spaces." Library web sites must maintain a high level of personalized, user-friendly service if they are to help students effectively use the resources available.

Literature Review

Many studies have been done recently on usability of web sites, but few have focused on the digital reference component of the academic library web site. Dewey discusses "findability" in library web sites in a 1999 article, and makes some excellent

points. In looking at usability studies done earlier, she notes that most of them have included users in the evaluation stage of site design, after the initial construction, rather than gathering user information in the early stages of site construction. Other articles of note on the topic say that web design should be "shallow," with all pages closely connected to the main page, and that site design should take into account various approaches of users who may seek information in many different ways. Specific to academic libraries, Dewey found that the two most crucial issues related to findability are, first, whether the services are "embedded" in the site or can be reached with one click on the main page, and second, whether the terminology of the site is intuitive for the service provided. She also mentions that, in analyzing selected library home pages, electronic reference was the most likely service to appear—but it still only showed up on five of twelve sites. Other, less frequently observed services related to reference included interactive library instruction, frequently asked questions, electronic tours, research consultations, and subject-specific instruction. Dewey also states that the findability of the library web site from the university's home page is also problematic. Five of the twelve sites had a direct link to the library's home page, but the others were often difficult to locate. In conclusion, the article states that these library sites were successful in implementing "self-service features for reference and instruction" but more work needs to be done to address four problems: "(1) Users cannot understand categories where services are placed; (2) Current designs are often heavily based on the individual library's organizational structure, which is not intuitive to the user or does not have a bearing on one's particular information need; (3) Service features are buried; and (4) The Web sites contain too much information that is poorly placed."

Janes and Hill, in their 2002 study of digital reference practices, asked librarians to share their experiences in starting a digital reference service. The librarians' responses indicated that they really did not know what to expect when starting these services, and some said they simply followed their patrons' initiatives when they started getting e-mail reference questions via the "comment on the web page" link. In most cases the digital reference program began in response to user needs. Since these services are relatively new, many librarians are learning as they go along, or comparing notes with other librarians, which makes implementation seem risky. It may be difficult for librarians to know how much staff and budget they should allocate to digital service, and the nature of digital reference means changes in the formation of policies and guidelines, as well as in evaluation of services. But most librarians voiced concern over the transition of traditional reference to the digital sphere. One respondent worried about "losing the human touch," while others noticed that the reference interview tends not to occur via e-mail. Because of the nature of digital questions, and the limited interaction with the patron, most librarians surveyed noted that instruction was difficult and that this form of reference was best suited to factual or ready-reference questions. Other problems included a long response time that deterred patrons (why wait for the 24-hour turnaround when you can look it up on Google in a few minutes?) and the difficulty of teaching via chat or e-mail reference, so that patrons don't know how to find the answer themselves next time. On a more positive note, however, some librarians noted that answering by e-mail is less stressful than trying to find the answer while the patron hovers around impatiently, and it allows librarians to double-check their answers before sending them out. The results of this study seem to prove that most librarians are pleased with the

possibilities offered by digital reference and want to carry over the service aspect of traditional reference to their online work.

In the 1999 article by Janes, Carter, and Memmott, digital reference is defined as the answering of questions by electronic means. This definition takes in both the concept of librarians as assistants to people seeking information and the thought that librarians should implement new technology to benefit them in their work. At the time of the study, 67 of the 150 academic libraries examined offered digital reference services. Of these, 33 had links directly from the library's home page. Only three of the libraries had FAQs, and none of these dealt with reference questions at all. These libraries' digital reference services were exclusively e-mail and Web forms; none had chat reference or other technological methods of instruction. The services provided so far are considered a good beginning to digital reference services, and these libraries are likely to continue implementing other online services on their Web sites.

The 2002 article by Chowdhury addresses the question of whether personalized reference services are still relevant, since digital libraries and Web-based sources of information are intended to provide the user with direct access to information. The author quotes a 1999 article by Bunge that defines reference services as "the personal assistance provided to users in the pursuit of information." The proponents of digital libraries are busily attempting to develop an automated library that would connect users directly with information and remove the need for mediation by an information specialist. Is this possible? Chowdhury notes that at this time, little data is available on the evaluation of digital libraries and their services, since most electronic research is still in the development phase. However, studies of users' Web-searching techniques show that

most search engine queries are extremely simple, lacking complex search terms and Boolean operators. These results suggest that users still need assistance and training in online searching. Since Web-based reference sites do not allow for the traditional reference interview and refining of queries, they are more suitable for fact-based questions. Meanwhile, although the increasingly sophisticated digital reference tools can reduce the human workload, the author is skeptical of their ability to replace "human experts and personalized services."

The articles cited so far have looked at the usability and practical application of digital reference sites, but it is also important to consider users' needs and interests here. Trump and Tuttle, in their 2001 article, discuss an "altered user culture" that values chat reference services for their "point-of-need" availability. In the traditional model of reference services, the librarian acts as a "gatekeeper" for the library's store of information. In contrast, modern information resources include not just the library's holdings but also the entire contents of the Internet, which is definitely unmediated. Modern users, accustomed to this free access to information, value convenience and anonymity in seeking information. This article offers no evidence that users will ever stop needing assistance in information seeking, but it does suggest that convenience will be a higher priority than accuracy or depth of information. Thus the way to keep libraries relevant to users is to make library reference services the most convenient option.

Interestingly, most librarians have noticed that patrons prefer the anonymity of digital reference. This might have something to do with the phenomenon of library anxiety. Current theory suggests that library patrons today, especially undergraduates who come to universities with a high level of computer literacy, prefer digital reference

because it removes them from the actual "library" situation and allows them to access information in a manner more comfortable to them. The 2004 study by Jiao and Onwuegbuzie compares students' levels of library anxiety with levels of computer skill, hypothesizing that a student with negative attitudes toward computers may also have a higher level of library anxiety in the face of expanding digital information resources. They comment that the library, "once only a storehouse of printed materials, . . . is now a technology-laden information network where students can conduct research in a mixed print and digital resource environment, experience the use of advanced information technologies, and hone their computer skills." This study, and others which the authors refer to, confirms the direct correlation between computer anxiety and library anxiety. The significance in terms of libraries' digital reference services is two-fold. First, in this direct relationship, not only do low computer skills lead to low confidence in searching and increased library anxiety, but also increased computer skills seem likely to lead to less library anxiety. Second, the article points out that with the expansion of online searching, databases, and other digital tools, searching for information has become much more complex, and students now need a much higher level of information-seeking skills, which they may not have.

Other articles, instead of focusing on the digital aspect of academic libraries, are looking at students' use of the physical library and services there. Evidence suggests that while library use is indeed decreasing, the library as a physical place is still viable and even valuable—especially if it changes to accommodate students. A 1998 study by Clougherty, et al, gives some statistics about library use by undergraduates at the University of Iowa. They found that from 656 usable surveys returned, 86% of

respondents used the main library on campus. Most of these (72% to 68%) came to study, photocopy materials, or use books and journals. In terms of library services, 70% ask a librarian or library staff member, while 56% ask another student. Only 20% use the online tutorial, and nine percent seek assistance on the library's Web site, and just seven percent used reference consultations. (Which seems to suggest the question—is the tutorial not on the Web site? No indication is made.) In this survey, 56% of respondents in need of reference services asked a librarian for help in person, while only six percent asked reference questions via e-mail. Less than 50% of respondents had ever used the library web site. In suggesting improvements to the library, a majority of respondents suggested more staff training, more publicity about library services, and more library instruction. Other major areas of improvement suggested were a need to remodel the main library and a need for more chairs. Clearly this survey, conducted six years ago, expresses the needs of a lower-tech student body. Probably a more recent study would indicate much higher levels of use of the digital resources and services. However, it is interesting in comparison to more current data.

In a somewhat more recent study in 2001, Whitmore explores how undergraduates use the library. Her research focuses more on the students' progression of library skills. Like Clougherty, she does not single out digital resources, but looks at the whole picture of library use. This study found that a significant number of students liked to read or study in the library, and that if they did so as freshmen, they would continue to do so in later years. However, students also reported a decline in asking librarians for help. From the level of asking for help during the freshman year, this activity declined in the sophomore year and then remained consistent in the junior year.

The research does not indicate why this is the case, but it may be due to library anxiety, bad experiences with library staff, quality of the reference interview, or simply because students had learned the necessary skills as freshmen. This data suggests that libraries need to take a careful look at their reference services. However, the good news is that students here are still coming into the library to read and study, and the author notes a trend in libraries increasing hours to accommodate them.

A 2003 article by Shill and Tonner further discusses the academic library as a physical place. The authors discuss the future of the library building in light of the growing presence of digital services. Physical libraries are under great scrutiny right now due to several factors. First, electronic resources siphon off funds that otherwise could be used to improve facilities. Budget constraints add to this pressure, especially when administrators see declines in traditional usage statistics. The authors suggest a need for more and better research on student usage in new and renovated facilities. The real question here is, if research is taking place increasingly online, and if new facilities have increased rates of use, what is drawing those students into the library? The article notes examples of "library as place" in a social sense and also points out that print sources often are more user-friendly at this stage than electronic resources. The article also lists nonlibrary functions that have begun to share space inside the library, including computer labs, conference rooms, cafés and snack bars, art exhibits, and multimedia centers. These facilities help to physically draw students into the library and make it a comfortable place, like a bookstore or coffee shop.

Librarians are, in fact, aware of the changes taking place in library use, and have been quite proactive in using new technology. Tenopir and Ennis, in a ten-year study

from 1991 to 2001, describe the changes in academic reference services. In that time period, the number of libraries offering online services for their users jumped from 45% to 90%. One survey respondent noted that although most of these resources are self-service databases, the process of finding the correct database, searching effectively, and then finding the journal or full-text article is so complicated that the librarian still needs to help users. However, Web-based databases have contributed significantly to users feeling more comfortable with the resources. And because they are searchable for remote users, 44 of the 70 libraries surveyed offered some kind of online instruction. This survey also indicates that declining reference stats may be misleading—most patrons can do the easy searches themselves, but continue to seek help for more complex questions. In addition, respondents report that patrons are seeking increasingly obscure information, in the expectation that literally ething will be online. Librarians also find that answering questions takes longer because of the many sources available, and because of the need to instruct users on how to identify and use quality sources. The increased computer literacy of patrons does not necessarily indicate a more sophisticated level of information literacy. Many of the survey respondents indicated an increase in individual consultations and instruction.

One would also think that increased levels of bibliographic instruction would allow users to be more independent, and that these services would lead to a decline in reference use. However, in a 2003 study, Saunders found the opposite was true. This article analyzes data that suggests the number of reference questions increases in proportion to the number of students who receive instruction on information literacy. In this study, the number of reference questions recorded increased by two to seven for each

person who received bibliographic instruction. The author makes no conjecture about why this is the case, but it is possible to think that students who receive instruction learn just enough to begin to understand the full possibilities of electronic resources and to recognize their own limitations. Perhaps the students also become more comfortable with reference staff and see that librarians are a potential source of valuable information.

Julien and Boon also present good arguments for the value of information literacy instruction in academic libraries in their 2004 article. They studied students who received instruction sessions, comparing their knowledge and attitudes before and after the instruction. Students report that not only was the class helpful in teaching them how to use library resources, it also gave them more awareness of what resources were available and more confidence in using the library. This confidence reflects not only their own increased skills, but also a better understanding of how librarians could help them and a greater level of comfort in asking librarians for help. Students reported that the knowledge they gained through instruction sessions gave them a greater understanding of library materials and services, leading to easier and quicker research for assignments and better grades. On the negative side, however, students complained that the sessions did not cover Internet searching, and that in some cases the sessions were boring, especially the ones which lacked a hands-on component.

These articles examine several different aspects of library services, but they all question the conclusion that library services are unnecessary to academic library users. The shift from traditional to digital reference is changing the appearance of reference services, but a brief look may not tell the whole story. For example, by traditional standards, reference questions have been declining in frequency; however, librarians

report that they are fielding more in-depth questions which require longer answers. They also say they are much busier now as they try to keep up with all the different ways of providing information. They may be making fewer marks on the "stats" sheet, but clearly these librarians are providing an increased range of services to library users. These new library services sometimes increase demand in other areas, suggesting that library users need a more complex range of services to cope with their information needs. If library reference questions increase in direct proportion to the number of students receiving library instruction, perhaps the volume and depth of information is growing more rapidly than the information tools' ability to provide access or the users' ability to search effectively—which means reference librarians will be in more demand, not less. In addition, library users still bring the same issues to reference settings, both online and traditional. Library anxiety still exists. The librarian concerned with "losing the human touch" brings up a valid point, but certainly digital libraries can be as user-friendly as traditional settings, and sometimes more so, if they are designed correctly with the user in mind.

Methodology

This research began with the idea of finding out what services academic libraries could offer students to increase their use of library services, particularly reference. Many libraries now offer special services like term paper clinics, in-house librarians in campus housing at certain times, and other aids to link students with information. The literature in this area points to a clear shift in the information-seeking behavior of undergraduate library users, but few studies seem to look at this shift from the point of view of the

user's first impression and subsequent interactions with the library, nor does most research explore the relationship between the physical library and the digital component. In fact, many researchers tend to treat the two as separate components, when in reality they are simply different outward trappings of the same entity. Theory and research are all well, but I was more interested in what real libraries were actually doing to encourage students to use both the physical library and online reference services. What are libraries doing to address problems like decreased library use, declining reference statistics, increased reliance on Internet sources, and persistent library anxiety symptoms among undergraduates? From the user's perspective, what are libraries doing right? I reasoned that the best place to start would be the libraries' web pages, since they may be the first point of contact initiated by the student toward the library.

This evaluation of academic library web sites is similar in design to the 1999 study by Janes, Carter, and Memmott, in that I looked directly at library web sites rather than surveying staff or students. This approach seemed best because, first, the web site may be the first place a tech-savvy but library-anxious undergrad would look for information, and second, direct statements from either librarians or students would have a bias toward either group rather than meeting on the middle ground. In my own research, I expected that librarians would say, "The challenges of providing reference services to this population are A, B, and C," while the students would say, "The problems with the current library system are X, Y, and Z," while the web sites would show the actual connection between the two. Unlike the 1999 article, however, I looked at fewer sites—forty for the initial evaluation and ten for further study—to gain a more evaluative, in-depth perspective on the services offered. The objective is not only to say that X

percentage of libraries offer chat reference, but to comment on the quality and accessibility of the service.

I chose the libraries from a list in a college directory published by the Princeton Review in 2003 which rated the twenty best and worst libraries according to students. I used this list only because it contained approximately the number of sites I wanted to review and also gave a good mix of large and small, public and private four-year institutions which would eliminate any slant toward a particular geographic region, college size, tuition cost, or other factors. I did not know what qualities students used to judge the libraries on these lists, nor did I find (or expect to find) any correlation between ranking and quality of online services. The list was simply a convenient, random sample of web sites.

In evaluating these sites, I first approached each of the initial forty as if I were an undergraduate with an information need. I developed four questions that would give me some sense of what types of services the library offered and how easily they could be reached online. My questions focused on types of services that seemed most likely to draw users into the library or bring reference services to them within their comfort zones. The first question was, "Can a student request individual reference instruction?" This question addressed the debate about librarians being less essential to digital reference, the concern of some librarians about losing the "human element" in reference services, and the observation that the more complex databases and other electronic information sources may require more extensive and personalized instruction. The second question was, "Is chat reference available?" This question addressed the trend toward tech-savvy users who want "pizza deli" reference—quick, round-the-clock service on their doorstep.

Since chat reference tends to be dependent on the size of the institution, I noted the enrollment of the university for comparison. The third question was, "Does the library have an online tutorial?" This question addressed a possible trend toward more self-guided tools as part of an instruction program. The fourth question was, "Does the library rent videos or DVDs?" This question addressed the possibility of increasing library use through services similar to ones a student might use elsewhere, such as video rental stores, coffee shops, and bookstores. I chose to look for this service rather than a library café because it is more likely to be mentioned on the library web site, and because it may appear in conjunction with other facilities such as a multimedia laboratory, which also would increase traffic to the library. In addition to these questions I noted the "overall impression" of the site and its services, including library services and design features that added to or detracted from the appeal and usefulness of the library and its web site. Coffee shops, virtual maps, Ask A Librarian features, and links from the university's main page all contributed to a favorable impression, while illogical site structure, distracting design features, and a basic lack of services did not.

As I reviewed each site, I took note of some especially excellent examples, ones that I would like to use as a student, and also a few problematic examples which illustrated some common pitfalls in site design or service availability. I included in this group some sites that seemed good at first but proved difficult to use, as well as sites that at first looked slightly unusual but in fact had some clever or innovative features. These sites were subjected to a much more thorough review of both structure and content. I wanted to get a complete look at how libraries were developing the service aspect of digital reference, how they addressed the needs of the student population, and how good

online services might be a natural extension of good traditional librarianship. I held these sites up to no specific qualifications or standards, but judged them by my own impressions and logical sense of what should work.

Data Analysis

With a sample size of forty documents, some basic numbers and percentages give a preliminary indication of services offered at these institutions.

Individual reference instruction sessions are offered by thirty of the forty libraries, or 75%. Libraries used many different terms to refer to one-on-one consultation with a librarian, including Reference Tutorial, Subject Librarians, Term Paper Clinic, Library Liaisons, Research Consultants, and Library Consultation. It seems promising that three-quarters of libraries allow students the chance to request one-on-one instruction with a librarian, often a subject specialist. This number may indicate that libraries anticipate the value of this service and the likelihood that patrons will want it. However, this service is easy to offer; the library would lose little time, effort, and expense if students did not take advantage of it. The libraries definitely varied in their approach to promoting this service.

Chat reference is offered by a total of nineteen libraries, or 48%. However, when the libraries are divided by enrollment, only two of eighteen libraries, or 11%, at small institutions (less than 10,000 students) offered chat reference. Of the larger institutions with over 10,000 students enrolled, seventeen of the twenty-two libraries, or 77%, offered this service. The chat reference service seemed more likely to be prominently displayed on the sites that offered it, with more links from the library's main page than the other

services, probably because offering this service requires a proactive approach and a

significant investment of budget and staffing to implement, while other services are much

less complex. This service is becoming a popular tool in many libraries, and probably

more students use chat reference than any of the other services, making it well worth the

investment in most cases, but smaller institutions clearly still struggle with

implementation. Of the two small universities offering chat reference, one is actually a

school with a library science program, giving them at least a large base of almost-

professionally-qualified MLS students to staff the service. Some libraries attempt to

solve the problem of staffing by having the service open at limited hours, but this seems

to defeat the object of the "point-of-need" service.

Online tutorials are offered by fifteen of the libraries, or about 38%. I included in

this figure any instructional tool that relied on technology, including video, audio, or

interactive instruction pages, but not simple guides like FAQs and subject guides. Of the

twenty-five libraries that did not have tutorials, nine (or 36%) had extensive simple

research guides. Most of the others had a few simple guides or FAQs, and most of the

libraries with interactive tutorials also had simple guides. With only 38%

implementation, the online library tutorials are the least frequently offered of these

services. Library tutorials have some disadvantages—they are more complex to design

and implement than a simple subject guide, FAQ, or list of subject-specialist contacts,

and they are less immediately useful to students needing quick information. However,

they allow students to understand the workings of the library and the research process in

a low-anxiety setting, and they also address some of the problems librarians notice with

chat or e-mail reference—namely the difficulty and inefficiency of providing detailed

explanations of basic reference procedures without the benefit of in-person instruction time. Tutorials are probably most useful in conjunction with an instruction program, or as a starting point for faculty trying to teach research.

Video or DVD borrowing collections are offered by twenty-four libraries, or 60%. Of the other sixteen, many had videos interfiled in the main stacks, but did not have a separate collection, although one had a separate video collection that was exclusively academic. Access to these collections varied; most were in a separate area, but some were kept behind the circulation desk.   few collections had a separate search function. It seems encouraging from the perspective of increasing foot traffic in the library that more than half of these facilities have extended their role beyond "strictly academics." Videos interfiled in the collection are generally considered a complement to scholarly research, while a separate video browsing area feels more like Blockbusters to students who might otherwise not visit the library. And for librarians concerned about taking up valuable space with a non-academic collection—first, it brings students into the library, and second, browsing is an information-finding technique that should be encouraged. Many video collections are housed in conjunction with multimedia production centers which also provide service to students working on highly technical projects.

In addition to these four questions, in my overall impressions of the site I noted which libraries were linked from the university's main page. Of these sites, twenty-six (65%) had a direct link from the university's home page. Not included in this count were seven who linked from a dropdown menu on the main page; although technically they did link from home, the link was not immediately visible on the page. Most web connections to libraries, if not directly indicated by a "Libraries" link, were through the Academics

page or menu. Others were combined with Computing, Information Services, Arts and Museums (2), and Academics and Research (2). This issue seems like a small thing, but many students don't know the library's web address or where to look for it. If they don't see it on the main page, they may assume it doesn't exist. Compared to a library's physical location, this makes sense—a library right in the middle of campus, next to the student center or the dining hall, is going to get a lot more use than a similar one out on the edge of campus. In the same way, a library with an obvious, visible presence on the university's home page is more findable to students.

Even more interesting than whether libraries offer digital services is how they offer them. The libraries' web sites differed widely in content, design, organization, and usability. Both strong and weak points in these sites can fall under four general categories: aesthetics, or how easy this site is to look at; comfort and ease of use, or how much work a user must do to find information; organization, or whether the categories and headings make sense to the user; and features, or what services and resources the library offers via the web site or in person.

The aesthetic appeal of a site was usually obvious from the start. On the first site I visited, when trying to find the library from the school's home page, the dropdown menu flickered annoyingly with e movement of the mouse. A few other sites had the same problem. Another common problem was tiny typeface, making the important features difficult to read. On one site, not only was the font tiny, it was bright red, with poor contrast to the background that created a glare. Another site had the same problem with bright blue text. Users don't want to squint and blink while reading the site. Some of these reminded me of the yellow/orange/black striped carpet in my own undergraduate

library, which always made patrons complain of headaches. Attractive color combinations are subjective and probably depend on the school's colors (UNC, for example, tends to use a lot of Carolina blue), but hard-to-read text is difficult to use. In addition, sites can look confusing and messy due to the layout of text. One site had a horizontal look, which might not have been so difficult to read except that the main headings were all pushed to the right side of the page, drawing the eye away from the smaller sub-headings and links underneath and to the left. Another site seemed to have no standardization of color or line, creating a haphazard appearance that may confuse the user. Other sites, in their attempts to link ething from the main page, made the site look cluttered so that its important features were obscured. The aesthetic features of a site are not the most critical indicator of good content and usefulness, but they can definitely make users want to leave.

Comfort and ease of use are partially related to the site's aesthetic properties. If the aesthetics of a site are similar to the interior decoration of a building, its ease of use is similar to the service desks. The most common problem in these sites was too much depth, too many levels of information. Users must click several times—from, say, Services to Reference to Ask a Librarian to Subject Specialists—a daunting task for many users. First, this design requires them to make a series of decisions, increasing the possibility of getting lost. Second, even when users know the service is there, they may not take the time to search for it, and if a user does not know the service is available, the opportunities for a chance encounter are low. Burying essential services three or four levels deep on a site is like building the reference desk on the top floor behind the administrative offices—it has no visibility, it gets no walk-through traffic, and even to

those who know it's there, it is "out of sight, out of mind." Unfortunately, several sites

had this problem due to an overly "clean" look, with no actual information on the main

page. Less common, but still a problem, were the sites with too much information to read

through. One site used wordy, complex language in its descriptions, and while the text

was not lengthy, it was also not skimmable and took considerable mental energy to read.

The use of technology presented another problem. Some sites have technical features

that might be difficult for a less tech-savvy user or one with an older computer, while

other sites, in contrast, have developed a attractive print handbook and put it online with

few modifications, failing to take advantage of technologies that would allow better

communication with their users. Other ease-of-use considerations include some aesthetic

features, like the tiny type and flickering menus. Are these features going to hinder

someone with a physical impairment? Will visually challenged users be able to see the

sites clearly, and are patrons with muscular problems or imprecise computer tools able to

click on tiny or flickering links?

By far the biggest problem with most sites is organization. Sites are frequently

designed with librarians' logic, for library staff's convenience, and not in a way that

makes sense to a library user who is generally not a librarian. Other web sites are

designed with no structure at all. Large libraries face an especially difficult challenge in

organizing large amounts of information and complex services, leading them to create a

busy front page with many links. Basic services such as Ask A Librarian are easy to

locate, and the actual subject guides and other online resources are useful, but finding

them in the huge volume of information is difficult. Another main organizational flaw

on many sites involves poorly labeled categories. Research has shown that this problem

exists in library buildings as well as online. Library users are unfamiliar with terminology and may not understand "circulation" or "periodicals." This problem is even more complex when dealing with resources specific to each institution, or services that have no standard name. The "individual instruction" question showed several different terms to mean "a one-on-one session with a librarian for instructional purposes." How are users to know that they should be talking to a Library Liaison or asking for a Research Consultation?

Some of these library sites have no major problems with organizational structure; they are pleasant to look at and easy to use. Unfortunately, they also have little to offer the user. This problem seemed to appear with the smaller libraries, who may not have enough staff or resources to offer a wide variety of services. Unlike the big libraries who have a large amount of content to organize, these libraries just have the basics. However, almost all the libraries offered some special service, online or at the library itself, to help students use the library. These features included reference services like chat and e-mail reference, subject specialists, and research guides for subjects or classes. Instruction services included classes, library tours, workshops, and tutorials. Other useful features included glossaries of library terms, maps of the library (some interactive, even more helpful), browsing collections, video/DVD rentals, computer labs, audiovisual facilities for multimedia projects, art exhibits, cafes and snack bars, and group study rooms. Some of these services are costly and difficult to implement, while others would be relatively simple for even a small library.

While reviewing these sites, I began to form ideas about what works and doesn't work for digital reference, and to pick out a few sites that were shining examples of

library web sites, as well as some that had serious problems in design, organization, or content. I ended up with a list of six sites that have done a lot of things right in their web presence and four sites that represent some common shortcomings in library web site design.

Yale University is one that gets it right. The library's main page is well-organized and easy to read. It has a series of "Quick Links" to the right of the page, including Ask A Librarian. The catalog search box at the top is useful for quick searches. The central part of the main page seems to be organized for the convenience of both students and library staff. Content is divided into four categories, with several sub-headings under each, chosen to make sense to the user without straying too far from the traditional library departments. A click on Reference Services or Ask A Librarian brings up a complete list of ways to get reference help, including chat reference, e-mail, phone, in-person, and appointments with a subject specialist. Along the top of this page are the links to the other main categories, as well as the sub-categories in the same section. All the pages in this site contain a link back to the main page. Some pages are cross-linked with other related pages—for example, Subject Guides, under Research Tools, also can be reached via the Reference Services page. In addition, this page indicates it was updated April 6, 2005—a good sign that someone is keeping the information current. The only flaw in this library site is its connection from the university home page. The link off the Yale home page leads from Academics to Libraries to a list of main library topics, the first being the actual library home page. The other links lead to intermediary pages that describe each service. It's not terribly difficult to use, but it seems unnecessary.

The Boston University Library site is another strong example of digital reference service. First, the "Libraries" link is easily available at the top of the university's home page. The library's own home page is well-organized and has some special features to help the user. For example, on the main page, content is divided into Research Tools, Services, About, and News. In addition, this page has a catalog search box, a How-To box, and an Ask A Librarian (Phone/Chat/E-mail) link. As with the Yale site, each page here has consistent, conveniently located links to the main page, each of the four main categories, and all the sub-categories within the same section. In addition, some pages have How-To boxes with common questions and tasks within that category, like How To . . . Ask a reference question. In addition, the virtual tour of the main library contains not just maps, but detailed information about the library.

The Miami University library site also is excellent, although somewhat hard to find. It does link directly from the university's home page, but the link is relatively small. It takes the user to an intermediate page, where a link titled "Internal Web Site" leads to the library web site. This link is inconspicuously placed, ambiguously labeled, and not intuitive for the user. The main library page is attractive and arranged somewhat differently from the usual categories. The central part is divided into two categories: Research Resources and Services & Information. Instead of the usual "Circulation" or "Reference," this site has links to Get Help, Your Circulation Records, and Staff & Departments. On the left are boxes for Quick Search, How To, and Get Help. The library offers chat reference, although the Get Help button is somewhat misleading and lists only phone and e-mail. On subsequent pages, the left-hand boxes link back to the two categories on the main page. In all the most usable library sites, the importance of

organization is clear; patrons should be able to go into the site a few pages and then easily navigate to other sections or get back to the main page. No library building would require users to go out and come back in to get from Reference to Circulation, but many library web sites do so.

So far the best library sites have all been from larger institutions, but the Catholic University of America is a small school with a great library site. It is easily available off the school's home page. It has four main categories, similar to the Boston site except that one whole category is devoted to Need Help? The Online Chat reference link is last on this list, but it is still easy to find. The best feature on the main page is the description of services that pops up when the user mouses over each link. Unlike the other sites, this one does not carry all the categories over to subsequent pages, but instead has a search function for the whole web site. The amount of content is small enough on this site that getting lost doesn't seem to be a major problem. This small library has all the fancy options like chat reference and online tutorials, but then, it should—this school is home to a library science program, which puts their library a step ahead in terms of knowledge and staffing, an advantage other small schools may not have. Aside from the lack of structure on the inner pages of this site, I have only one complaint—the News feature says that the main library has just added the one hundred greatest movies of all time to its video collection, but I could find no location for this collection.

In contrast to the small library at Catholic University of America, the Purdue library faces the task of providing services to a large student body. They are able to manage a large amount of high-quality content on this site without making the organization too complex. This page links directly from the university's home page. The

central portion of the main page is divided into a catalog search box, a news box, and a list of key resources, including e-journals, course reserves, finding articles and data, research guides, ask a librarian, and CORE (a tutorial). Using an acronym like this is generally not a good idea because users may not be familiar with it, but this site includes short descriptions under the links to take care of this problem. At the top of the page are some "quick links" that link to hours, maps, reserves, interlibrary loan, and students' library accounts. A menu bar across the top lists eight links to content, some with dropdown menus. This menu bar is consistent across all the library's pages, which is useful in navigating the site. I especially like the way the organization and navigation tools remain consistent from this site to the other campus library sites, and that finding other library home pages within the system is easy. Some sites give the building's official name without specifying whether it is the main library or a branch. But the most useful quality of this library's site is the logical progression into the content. A user need not get lost looking for the subject guides. This site has only one minor flaw—the blue links and the black-and-brown menu bar are easily readable, but they really do clash.

The library serving Indiana University of Pennsylvania is well-organized in addition to being attractive. A menu bar down the left side of the page gives easy access to quick-reference needs, like library hours, chat reference, how-do-I guides, and a new "bring your assignment" link to research consultation. Unfortunately, this site only offers three "how-do-I" guides. The center of the page has links to books, articles, services, instruction, and research guides, with pop-up menus when the user mouses over them. Within the site, the left-hand menu continues to appear. This site is not as deep as some others, and it seems not to create navigational problems for users. This site also has a

thorough and helpful virtual tour of the library (and they have a coffee kiosk!) but its placement under Administration/Information may not be intuitive to many users.

In contrast, the U.S. Air Force Academy library site is quite plain. It links from the main page via a dropdown menu from Academics (which works well in Internet Explorer but flickers distractingly in Netscape). This site clearly explains which is the main academic library and which are branches or community libraries. On the Libraries page, the user can click to go to the Academic Library or select a service from the dropdown list. No doubt this is designed to save time, but I wonder how useful a user would find this feature. The main problem with this page is that the "Have a question?" link goes directly to e-mail, without telling the user who will receive the message. On the academic library's main page, the design is extremely simple, with five major links— general information, library services, resource collections, the library catalog, and web resources. Each of these, except the catalog, has a dropdown menu listing the options on that page. This site has little depth, and, for example, all library services—circulation, interlibrary loan, reference, etc.—are on the same page. The site has less depth than it needs for the amount of content available, and it actually has little content. More seriously, this site lacks a direct connection between its primary users, the students, and reference librarians. A list of subject librarians gives only phone numbers, and information on the site seems to indicate that only instructors should arrange for library instruction. Finally, unlike many sites which have been updated within the last month, this site has not been updated in over a year.

The library site for Dickinson College is unusual—their library is combined with the information services department. The main page of the library, a tab off the main

page, has just a list of links to various items. No organization is evident. The Help! link

on the left-hand menu leads to a page of links including how-do-I guides, orientations,

library maps, ask a librarian, and training/tutorials (in addition to some computer-related

help items) but they again lack organization. Why would library liaisons be under

"subject guides" but not under "ask a librarian"? In fact, the "ask a librarian" page is

only an electronic form, with no indication of who will receive the information or how

long it will take to get a response. The "training and tutorials" section is useful for

computer information but has little information about library use—only two simple

tutorials on evaluating resources and citing sources. In the "course guides" section linked

from the front page, the search function for specific courses is useful. The subject guides,

however, are less useful—some topics listed don't link to any guides. On a positive note,

the guides available are comprehensive, well-organized and useful, and they even

connect to the appropriate subject librarian. If the students find these, they'll be doing

well. But curiously enough, the note at the top of the page advises students to contact the

library liaison (with link) or the circulation desk if they have problems with resources.

The circulation desk seems an odd place to route this type of question. This library

seems to have some good resources, but this site just doesn't make them easy to find.

Stanford University has a similar challenge to Purdue—they have a large volume

of information and many useful resources for students. They just don't manage it quite as

well. The site links from Academics on the university's home page, but the tricky part is

finding the correct branch if the user doesn't already know that Green Library is the main

facility. The Ask Us link is hard to find at the top of the screen, and it links to a web

form which, if the user is not careful, may be the wrong form. The correct form for

reference questions links off this page. In addition, many of the links from the main page are not intuitive to users, who may not connect " subject specialist directory" to people they can e-mail about their subject-specific research questions, or may not realize that the "key to information literacy" is a tutorial to learn about the library online. In addition to problems of user-friendly labeling, the main page has too much information. The amount of help available to students is fantastic, but it needs some structure. One helpful design feature is that the menu from the front page not only follows to the other pages, but expands to show options on that page—similar to the help menu on many word-processing or editing programs that users may find familiar.

The Westminster College home page provides a link to the library's main page via a dropdown from Resources. The main page is attractive and lists six categories, including Books, Journals, Electronic Resources, Library Handbook, Resources by Subject, Interlibrary Loan, and About the Library. No "help" link is available on this site. In fact, this site seems not to include any features designed to connect students with library reference staff. Instructors are invited to arrange information literacy classes, but the library offers no tours, consultations, or online reference presence directed specifically at students. The site design contributes to the problem; most of the material appears to be scanned or copied directly from a printed handbook. This design was probably practical, simple, and economical when the site was constructed, but it creates unnecessary limits on the features offered to users. For example, this site has no library tutorials or other interactive design features that could compensate for its lack of connection to librarians. The site does note a few interesting features in the library,

including a browsing collection and study rooms, and the collection of subject guides is useful, but in general the site fails to help students connect with library resources.

Conclusion

By investigating these web sites' strengths and weaknesses in providing reference services to users, librarians can clearly see that digital libraries are not simply pages and databases full of information. A library's online presence needs to provide users with the same services as the physical library, only more conveniently accessible. The usefulness of a library's web site depends not only on the features it offers, but also on its aesthetic appeal, ease of use, and organization. The library web site, like the physical library, must be carefully designed for the users' comfort and convenience. The weak and problematic sites in this study showed the difficulties a user can encounter in using these sites. First, users may not even find the site. Within the site, glaring design problems can blind users to the available resources. Users may get lost within a site or miss resources that could have helped them. Poor organization discourages users and makes them likely to give up their search without finding what they need. A lack of personal guidance from librarians can be intimidating to users and make them hesitant in using the site. Users with library anxiety may need a comfortable way of requesting a librarian's assistance. In many ways, a poorly-designed web site can leave the user feeling more confused and disconnected from the resources than even the most intimidating library building. In contrast, the best sites in this study show what a strong, useful library web site should look like. It should be easy for the user to find. It should look professional and tidy. It should allow users to easily find and access the necessary resources. It should be well-organized and structured in a way that encourages even the most timid undergraduate to

use all the necessary resources. It should offer a variety of services in response to users'

needs and wishes. It should allow the user to comfortably seek help whenever necessary.

This study is not meant to be the conclusive word on digital reference services,

but only to suggest a set of considerations that will allow librarians to approach digital

reference with the same service-driven attitude that has marked good libraries up to this

point. The subject of digital reference is quickly developing, and many studies would be

useful to this topic. I would be especially curious to find a more current assessment of

undergraduate library usage patterns. Are students studying in libraries more now, or

less? What features (browsing collections, videos, coffee shops, etc.) encourage students

to use the library? Do circulation and reference statistics continue to decline? Has the

decline in reference reversed in libraries that offer chat reference? Have librarians

figured out a better way to keep statistics on the new pattern of fewer, but more detailed,

reference questions? Are students who use chat reference more likely to come to the

physical reference desk? Do students use the online tutorials, and do they find these tools

useful? Librarians have an incredible amount of technology available now, and

researchers must examine the best ways to use it.

One thing is for certain: digital reference is now a definite part of any academic

library, and librarians need to use these new tools. In this technology-driven world,

information is everywhere. Librarians cannot contain themselves in traditional structures

and patterns of reference work and complain that students never visit the library, but

instead must behave as professionals in any competitive, service-driven industry and find

ways to offer higher-quality information, more personalized service, and quicker

response time to questions. Library web sites, if used correctly, are an excellent tool for

the task.

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