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# How the presentation of electronic gateway pages affects research behavior

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## Abstract

**Purpose** – The paper aims to provide details of a study conducted at Hunter College Libraries in fall 2005, the focus of which was how presentation of initial digital resource pages (or gateway pages) on the library's web site impacted students' subsequent steps in the research process.

**Design/methodology/approach** – A group of 16 students from English and History classes at Hunter College were recruited to participate after having had basic library instruction. They were given computer-based key tasks to perform in a proctored classroom setting, using the library's homepage. A second group of students was recruited to participate in two small focus groups. The methodology and exercises were developed in part using guidelines from a taxonomy of user behavior developed by librarians at Hunter College, and recommendations from usability literature by Krug, Neilsen and Rubin.

**Findings** – Results from the computer-based key tasks exercises were bifurcated. Completion rates for computer-based key tasks using the in-house developed Hunter College Library database grid, with less than 80 percent (37 percent-73 percent) students successfully completing all the tasks, was inferior compared to performance using the Serial Solutions access page and the Academic Search Premier database, both commercially-developed products, with most of the tasks successfully completed by at least 80 percent of the students.

**Originality/value** – This study is unique in that the focus is not on the usability of an entire library web site, rather, on the presentation of select, highly visible gateway pages that get a lot of use.

**Keywords** Electronic journals, User studies

**Paper type** Research paper

## Introduction and purpose

The purpose of this study is to take a close look at how the presentation of digital resource gateway pages on the Hunter College Libraries web pages, and the resources they connect to, affect the web-based research activities of students who use those resources. The Hunter College Libraries faculty teaches more than 7300 students each year, with content ranging from basic catalog searching to advanced research strategies using a variety of library databases. This instructional history presented a unique opportunity to observe and document one component of student research behavior to better inform teaching strategies in the future. There are a number of important points of first contact for students entering the library: the first physical contact (the first time the student finds and enters the library space); the first human contact (the students' first contact with library staff whether it be with professional or paraprofessional staff); and the first electronic contact (the first time the student visits the library's web pages). Each of these presents an opportunity to teach the



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“uninitiated” (Cobus *et al.*, 2005) user something about the library that might later facilitate their research. “Electronic contact” is a relatively new point of access in the history of information literacy. Examining the web interfaces of electronic resources is only one way to improve teaching strategies.

While this study looks at the way electronic gateway search pages affect students’ research behavior, many articles have recently examined whether undergraduates, accustomed to visual stimulation in their learning environments, have the type of critical thinking skills to ask the type of questions which would take them to these gateway pages and use them effectively. Do students even know enough to realize when their search strategies are inadequate for their research needs? Students begin college with different levels of cognitive skills; how do librarians address the different needs of students? Weiler (2005) observed that the way students view their information universe affects their ability to develop critical thinking skills. In today’s complex information environment, it is more important than ever before that librarians teach “thinking strategies” which enable students to successfully do academic research (Macpherson, 2004). Students’ motivation is another important element in information literacy. Students will be more motivated when they are not frustrated by poorly designed gateway pages.

With this in mind, an important objective of this study is to examine the placement, layout and functionality of certain features on the library’s electronic resource gateway pages – in an effort to facilitate better use of the library’s web pages and of the digital resources themselves. These introductory pages are the main entry point for the user in search of information, and implications for the presentation of these pages are numerous. The first interactions of the user with the digital environment can be discouraging, confusing and frustrating. Issues of usability are of great concern – a gateway page that is not well laid out can easily discourage a user from visiting that page again. For college students, a library resources gateway page whose design encourages and facilitates use is critical, as college student use of library electronic resources is relatively low (De Rosa *et al.*, 2005). These interface design deficiencies must be addressed before any performative assessment of research skills using web-based library resources can be made. As Vassiliadis and Stimatz (2002) have noted, apparent deficiencies in web-based research skills or knowledge may be fundamentally an indication of poorly designed web resources. This study aims not to examine how students use a particular database, but rather, how these initial introductory pages affect their next steps in the research process.

The literature presents extensive findings on the effects of electronic resources on research behavior. Presentation of these online resources frequently falls under usability. While not strictly a usability study, this report will still assess the impact of certain usability factors on research behavior.

## Background

Academic libraries all over the world today provide unprecedented access to electronic resources for library users. The Hunter College Libraries are no different, and currently provide access to some 21,944 electronic journal titles. Hunter College Libraries are a nexus of information and academic activity that provide service on a campus of 20,000 students in New York City. Hunter College is one of the 19 City University of New York (CUNY) schools. It is a highly urban campus where most students use subways and buses to commute from their homes, often located in distant neighborhoods. The CUNY system is a major urban university system composed of two-year colleges, four-year colleges, a PhD-granting graduate school and a law school. One of the oldest

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CUNY schools, Hunter enrolls undergraduate and graduate students in a wide range of liberal arts and professional programs, with both full-time and part-time options. Hunter College is a reflection of New York City, where a wide variety of cultural, national and socioeconomic groups coexist.

Many Hunter students are native New Yorkers; however, a large percentage of Hunter students come from outside the city. Echoing recent immigration trends to New York City, the student population represents more than 80 different countries. First year Hunter students epitomize this diversity- in that 27 percent hold green cards and 42 percent speak a native language other than English. A majority of the students are the first to attend college in their families, and approximately 60 percent hold at least one job in addition to attending school. The average age of undergraduate students is 26[1] (Hunter College, 2004). While many first year students enroll directly from high school, a significant number are returning to college after a long absence or have transferred from two-year colleges.

### **Literature review**

In a nationwide study conducted in 2003 in Quebec by a team of librarians and other academics, various aspects of student research capabilities were measured. More than 3000 students participated. One of the haunting conclusions of the study was that “a significant number of students have limited knowledge, or no knowledge, of basic elements characterizing the research process”[2] (Mittermeyer, 2003). The authors also indicated that based on the study, most students are “ill-equipped to deal with increasingly information-intensive learning environments” such as libraries.

Weiler (2005) suggests that students entering college today are primarily visual learners, that is, they learn better when presented with examples that they can see and replicate, and also, that they are able to make the best use of those resources which are visually stimulating in nature. The web presents a unique opportunity to capture the user’s eye immediately, and draw her attention to important features and points of interest on the page. In addition to the significance of the visual nature of web-based material, Nielsen (2000)[3] found that more than one half of web users are “search-dominant”, as opposed to “link-dominant”, meaning they are much more likely to look for the search box on a screen in order to help them locate a resource rather than explore a site by following links. Library web pages often present so much information that users are overwhelmed, and as a result, miss important directions that might help them find what they need. If what Nielsen found is true, and users do not tend to explore using links, the implications for library web sites, many of which are link-oriented, are serious. How do librarians make sure users are able to find what they need on library web sites regardless of their search/find preferences? While Nielsen advocates for attention to usability design, Ke (2002) suggests that instruction is a key component of the user research process. He states that since users are often unable to find and/or seldom read online help documentation on library web sites, this task is left to librarians. For this study, an important question was whether the placement of useful instructions provided on the electronic gateway pages should be more user-friendly.

Web-based resources allow users to take their exploration much further than they might be able to with print-based resources (Ke, 2002). What are the very first web-based information seeking steps taken by the user to initiate this exploration? One important consideration in this study is how users find electronic resources on the library’s homepage. How do they decide what to look for, and where to look? In a study conducted by Sathe (2002), the author found that 28 percent of users followed links

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from the online catalog; 7 percent used the e-journals web page; 12 percent used an internal list of e-journals; and 41 percent were introduced to electronic journals by library staff. The last statistic has great implications for librarians, as it highlights their importance in the research process. Sathe (2002) concluded that while electronic journals have not changed the essence of the research process, they have changed user preference for material format, and altered where users choose to look for resources. In a study conducted at Drexel University, Boyce (2004) showed a dramatic increase in the number of articles identified through an electronic journal search as compared to those articles found by browsing print journals.

The facilitation of research by way of the library web pages is inextricably linked to usability design, thus a cursory discussion of usability within the context of this study is warranted. Familiarity with basic usability design principles is a must when constructing information-rich pages, specifically library web pages, that are meant to support a diversity of academic research. Krug (2000, p. 5) defines usability as “making sure that something works well: that a person of average (or even below average) ability and experience can use it – whether it’s a web site, a fighter jet or a revolving door – for its intended purpose without getting hopelessly lost”. Researchers have found that users were very specific about the things on the library’s web pages that were confusing during the initial phases of their research (Cobus *et al.*, 2005). Users reported that the menu bar needed to be clearer, that links on the library’s web pages needed to look more like links, and that the interface should let them know when they were actually within a database, rather than browsing one of the library’s web pages.

The same study produced a taxonomy of user behavior and related implications for the design of the library’s web pages (Cobus *et al.*, 2005), and revealed some very important connections between the presentation of material on a page, and user actions. For instance, one observed user behavior was confusion relating to vocabulary on the page (or vocabulary limitation). The web page design implication was to use new terminology in activity-related contexts, such as placing the library catalog link under the heading “Find a Book”. Another observed behavior had to do with page searching expectations. The researchers noted during the study that anything that looked like a search box drew the user’s eye right away, corroborating Nielsen’s (2000) early findings. Users construed the box as a “search everything” box, which included trying to search journal articles in databases. The implication for page design was to place search boxes of any kind away from resource links they are not meant to search. Or vice versa – place boxes meant to search certain resources close to those resources.

The broader context of student research behavior and ability to think critically about where to find sources and how to use them is also a consideration in this study. It is important not only to make resources appealing and accessible but to recognize that students are not always equipped to assess the value of these materials. Students seem to prefer the convenience of the web for their research – this has been documented by researchers such as Armstrong (2001) and Whitmire (2001) – but librarians recognize that the problem lies not in students’ ability to locate these sources, but rather, their ability to determine which material is suitable to their needs. In addition, students are often not making the best use of the resources available to them. For instance, Nowicki (2003) found students do not make use of advanced search features, which may ultimately help them formulate better searches. How students perceive what is important during the research process also plays a role; Valentine (2001) has found that students tend to focus on the requirements of the assignment (number of sources needed, type of sources needed, etc.) rather than evaluating which sources might be

most relevant for their particular topic. The role of the librarian is critical here – a well-coordinated effort to blend information literacy into the syllabus with the support of the instructor is often the most powerful way to help students build critical thinking skills and understand the power of evaluating resources.

**Methodology**

The methodology for the study involved gathering data from users in two different ways: in-class library exercises and focus groups. Thirty-eight undergraduate students took part in the exercises, and eight students (seven undergraduate students and one graduate student) participated in the focus groups. The in-class exercises required students to engage in certain activities using the library’s web pages, and the two focus groups required students to answer qualitative questions about certain aspects of their research behavior. Before these tasks could be undertaken, the researchers first had to define the inquiry and investigation process.

First, the researchers identified the three components of the Hunter College Libraries electronic environment to be examined. They were: The *Hunter College Libraries* database grid; the *Serial Solutions* access page; and the *Academic Search Premier* database (see Figures 1 and 2).

These components are each “gateways” to the library’s electronic environment in some way. The database grid provides access to over 144 databases; the Serial Solutions page provides access to more than 22,000 electronic journals; and Academic Search Premier provides targeted access to popular and scholarly books, journals, and newspapers. The researchers felt that examination of these three access points would provide three different opportunities to examine student research behavior and the impact of these gateway components on their actions. Next, the researchers developed the questions to be used to guide the inquiry for each of the above three components,

**ONLINE RESOURCES DATABASES**

Hunter College Library & CUNY subscribe to excellent sources of information not available for free on the Web. All resources are available for [home use by Hunter students & faculty](#) using your Hunter email & password.

**HUNTER COLLEGE LIBRARIES**

HUNTER LIBRARIES

Main Library  
Health Professions  
Social Work  
Art Slide Library

LIBRARY CATALOGS

CUNY+  
NYC Libraries

ONLINE RESOURCES

Databases  
Electronic Journals  
Electronic Reserves (ERes)

RESEARCH TOOLS

Online Tutorials  
Subject Guides  
Reference Sites

MORE LINKS

**Browse by Subject**

Sociology

Mathematics  
Music  
News / Communication / Media  
Nursing  
Philosophy  
Political Science  
Psychology  
Religion  
Science / Technology  
Social Work  
Sociology

**Browse by Type**

Select Type...

Title  
P | Q | R | S | T | U | V | W | X | Y | Z | All

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**Alphabetical List (A-H)**

Academic Search Premier

AccuNet/AP Photo Archive

All-Press Watch

America: History & Life

American Chemical Society

American Civil War: Letters and Diaries NEW!

American FactFinder

**Alphabetical List (I-Z)**

Informe

Infoshare

Institute of Physics - Electronic Journals


Internet Library of Early Journals

JSTOR

Kraus Curriculum Development Library

Latin America Data Base

**Figure 1.**  
Hunter College Libraries  
Databases

 <p><b>HUNTER COLLEGE LIBRARIES</b> OF THE CITY UNIVERSITY OF NEW YORK</p> <p style="text-align: right;"><b>Electronic Journals</b></p>
<p><a href="#">E-Journal Home Page</a>   <a href="#">Library Home Page</a>   <a href="#">CUNY+</a>   <a href="#">Help</a></p>
<p><small>Please keep in mind that this list is a work in progress. Access is restricted to Hunter College-affiliated users. Most electronic journals provide only the most recent years online. To locate older issues (which may be owned in paper or microfilm), Search CUNY+.</small></p> <p><small><b>Note:</b> Access Electronic journals using any Hunter College computer (or off-campus using your Hunter College Proxy Server id and password).</small></p>
<p style="text-align: center;">0-9 A B C D E F G H I J K L M N O P Q R S T U V W X Y Z</p> <p> <input type="text" value="Title begins with"/> <input type="text" value="American Literature"/> <input type="button" value="Search"/> </p> <p> <input type="text" value="-- Please select a subject category --"/> <input type="button" value="Search"/> </p>
<p>1 record retrieved for the search: Title begins with "American Literature"</p> <p><b>American literature</b> (0002-9831)              from 03/01/1929 to 1 year ago in Academic Search Premier              from 03/01/1929 to 12/01/1999 in JSTOR Arts and Sciences I Collection and JSTOR Language &amp; Literature Collection              from 03/01/2000 to present in Highwire Press (Free Journals)              from 09/01/1999 to 12/31/2004 in Project Muse - Full Database Package</p>
<p><a href="#">Back to top</a></p>

**Figure 2.**  
Serials Solutions search page

creating a total of 16 questions. The three components and the related questions are presented below:

(1) *Database Grid:*

- Is it easy to find on the library homepage?
- Is it easy to navigate?
- Is the layout clear?
- Is it well organized?
- Are the search functions at the top obvious to the students?

(2) *Serial Solutions Page:*

- Is it easy to find on the library homepage?
- Is it easy to navigate?
- Is the layout clear?
- Is it well organized?
- Are the different search functions at the top obvious to the students?
- Which search features or access points do students use most often?

(3) *Database (Academic Search Premier):*

- How do students formulate their keywords?
- Do students limit their searching in any way?

- How do students assess whether their search has been successful, accurate, etc.?
- How long before students give up on a particular search?
- Can students interpret the results they get – is something available full text, pdf vs. html, etc.?

Finally, from these questions, the researchers had to construct the in-class exercises (using the library's web pages) and questions for the focus groups. Appendix 1 presents the in-class tasks and Appendix 2 presents the questions used for the focus groups. Krug (2000) provided some basic guidelines for developing exercises for users when looking at web usability and design. Though this Hunter study was not a usability test, the guidelines readily apply. Krug described two different methods of testing: "get it" testing and "key task" testing. "Get it" testing tries to ascertain whether or not users understand the purpose and function of a web site. "Key task" testing assesses whether users can perform particular exercises on the web site. The Hunter study used key task testing by having users perform the exercises in Appendix 1. The researchers followed usability guidelines suggesting the number of users to test. Nielsen (2000) demonstrated that by testing four to five users, researchers are likely to discover "the vast majority of usability problems." With 9 users, up to 90 percent of a site's problems will be uncovered, and if 15 users are tested, closer to 100 percent of usability problems should be identified. A total of 38 students participated in the key task portion of the Hunter Libraries study, a number certain to highlight a wide variety of presentation issues. The researchers recruited student users from a variety of undergraduate library instruction classes, as well as first year students from the college's orientation seminars. In order to make sure all of the participants had some basic level of library skills, students were only recruited from those classes that had already visited the library for instruction. The in-class exercises were held in the library's teaching lab, and Camtasia was used to record the key-strokes of the students as they went through each exercise. The researchers were present to proctor the session. The researchers also conducted two focus groups, totaling 8 students. The focus groups gave students the opportunity to talk about their library research experiences in more detail. Much of the data gathered during the focus groups could not have been gotten from the in-class exercises because of the qualitative nature of the information.

Finally, interpretation of what users did during the exercises was the final step in relating user feedback to presentation issues. The researchers in this study looked at how efficiently users were able to complete exercises by examining whether or not users found the correct answer(s), a method described by Augustine and Greene (2002).

## Results

The following section presents the results for each of the two methods used to gather data: the web exercises, and the focus groups.

### Web exercises

*Exercise:* Find a list of all the Hunter Library databases

*Testing:* To see if students can locate links on the library's purple menu bar (Figure 1).

*Results.* 32 students out of 35 (91 percent) successfully completed this task. The students who did not manage to complete the exercise clicked on the "Finding an Article" link in the middle of the homepage, which contains a general tutorial on how to



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use databases to find articles. Other students lingered on this same “Finding an Article” link, before moving on to select the correct link from the menu bar.

*Recommendations.* Since most students found this link relatively easily, the focus should shift to why those students who got it wrong did so. In this case, the confusing terminology for the tutorial link, “Finding an Article”, probably led students to believe they would find links to databases this way. The confusing link should be re-named to avoid confusion in the future.

*Exercise: Find a description for the database “LexisNexis”*

*Testing.* To see if students can find a description of the LexisNexis database, by clicking on the orange question mark next to the database name

*Results* A total of 25 out of 35 (71 percent) students completed the exercise. Most of the students who did not complete this task clicked on the name of the database and stayed on the initial LexisNexis page. A few went back and then found the orange question mark and clicked on it. Some only moused over the orange question mark but did not click on it. A few looked at the legend at the very top of the page, and recognized the orange question mark as the place to go for information about the database. Two students went into LexisNexis, and clicked on the “About” link on the LexisNexis page, which also had a brief description.

*Recommendations.* The question mark may be too small for users to notice. The size should be made larger. Also, there may be another more suitable icon that might be more intuitive for users. A review of icons used by other library web pages may also be in order.

*Exercise: Your sociology professor wants you to find articles for your paper. Find a listing of the databases available in Sociology*

*Testing.* To see if students could locate and use the Browse by Subject drop down menu on the databases page to find all the databases for Sociology.

*Results:* Ten out of 35 (28 percent) students were able to complete this exercise. This task proved very difficult for the students. Some students went to the Databases page, and located the database called “Sociological Abstracts”, and that was as far as they got. Others appeared to be browsing the databases page for any sociology databases they could find, mainly by looking in the “S” section of the grid. Four students went directly to the correct location.

*Recommendations.* Students did not seem to notice or understand the function of the “Browse by Subject” box at the top of the page. The box might need to be made more prominent. Also, students might not be clear as to the meaning of “Subject” in this context, so the name of the box might need to be changed as well.

*Exercise: Your professor wants you to find articles for a paper, and you have decided to use only online full-text articles. Using the library’s web pages, find a list of all the Hunter College Library full-text databases.*

*Testing.* To see if students could locate and use the “Browse by Type” box at the top of the Databases page and select the “full text” option.

*Results.* 13 students were able to complete this exercise (37 percent). Four students completed the exercise right away. One student clicked on the “Ask a Librarian” link on the library’s homepage, then went on to go into Academic Search Premier. Another student opened Academic Search Premier, checked the “full text” limiter, did not type

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in any search terms, and got thousands of results. Another student clicked on the database titled “Online Journals Publishing Service”.

*Recommendations.* Students did not notice the “Browse by Type” box, and probably did not make the connection between the word “type” and the material they were trying to find. Students may need more of a visual cue, such as an icon that signifies full text, so that this list is easier to find.

*Exercise:* You are beginning your research paper and want to know which journals are available to you online. Go to the page where you might be able to find this information.

*Testing.* To see if students could locate and use the “Electronic Journals” link on the library’s homepage to find out which journals are available online.

*Results.* 33 out of 35 (94 percent) completed the exercise successfully. One of the students who did not get the exercise correct clicked on databases, and then went into Academic Search Premier. Another student went into Academic Search Premier, selected the full text limiter, did a search without entering any search terms, then narrowed the thousands of results by clicking on the “Academic Journals” tab at the top of the results list.

*Recommendations.* Students seemed to be familiar with this link and understand its purpose. The name of the link might be changed to Full Text Electronic Journals to eliminate any possible confusion about what students will find there.

*Exercise:* Your classmate told you about a great article in the online journal called “American Literature”. Find out if the library has this online journal.

*Testing.* To see if students could locate and utilize the “Search by Title” or “Browse A to Z” listing at the top of the Serials Solution (Electronic Journals) page.

*Results.* 33 out of 35 students completed this exercise (94 percent). Four students out of the 33 used the A to Z listing to locate the journal title as opposed to the “Search by Title” box. A few students went to the Serials Solutions page and tried to look for the journal on the search by keywords in e-journals list, mistaking that list for a list of individual journal titles. Students used a variety of methods to search for the title, including title equals, title begins with, and title contains.

*Recommendations.* None.

*Exercise:* Your classmate also told you that the article mentioned in the previous exercise was published in 2005. Find a listing of all the full-text articles published in “American Literature” so far in the year 2005.

*Testing.* To see if students could locate a specific journal title for the years given, using the Serials Solutions page.

*Results.* 28 out of 35 students (80 percent) got this exercise correct. Some students went into the Academic Search Premier database and found American Literature, but did not find the full text articles there. Two students typed in “American Literature 2005” as their search term, which yielded no results.

*Recommendations.* Most students got this correct so there are no major recommendations. The information on the Serials Solutions pages explaining which databases to click on for particular years of journals can be confusing. Perhaps the layout and placement could be modified and the text and font could be made more prominent.

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*Exercise:* You are doing a paper for a Business/Economics class, and you would like to find out which online journals are available only in that subject area. Using the library's electronic journals page, find a list of these journals.

*Testing.* To see if students could locate and then utilize the "Browse by Subject" drop-down box at the top of the Serials Solutions page to find electronic journals in the subject area of Business/Economics.

*Results.* 29 students successfully completed the exercise (82 percent). A few students went to the Serials Solutions page and tried to look for the journal on the "search by keywords" list on the electronic journals page, mistaking that list for a list of subject areas. Other students typed in Business/Economics as a search term in the search box. A few students clicked on the letter B in the A to Z list, using the same strategy they might use for a title search. Though most students completed the exercise, it took students a little longer on average to find the correct links.

*Recommendations.* Presentation and layout might be an issue.

*Exercise:* Without using the search box at the top of the page, find the online journal called "German Quarterly"

*Testing.* To see if students could locate then use the "Browse A to Z" list at the top of the Serials Solutions page to locate the journal "German Literature".

*Results.* 19 students successfully completed the exercise (54 percent). Some students selected the wrong range of 'G's from the alphabetical listing, others stopped scrolling the alphabetical listing of journals before they got to the correct section, and never reached the section where they would find "German Literature" listed.

*Recommendations.* Students spent a lot of time scrolling during this exercise, and some gave up when the list proved too long. Usability studies have shown that users do not like to scroll, so perhaps the lists could be made shorter and thus more manageable.

*Exercise:* Your professor wants you to find articles about the effects of smoking on one's health. In the first search box, type the word "health"; in the second box type "smoking"; and in the third box type "effects". Limit your search to articles from scholarly peer-reviewed journals, beginning in 2003 and ending in 2005. Hit the search button once you have all the information entered

*Testing.* To see if students could figure out how to limit their search in various ways on the Academic Search Premier advanced search page (Figure 3).

*Results.* 29 students completed this exercise successfully (82 percent). The three students who were not successful only selected one limiter instead of two. Selecting the Scholarly (Peer Reviewed) Journals limiter was not a problem, but a few students had trouble figuring out how to input the dates. Also, once students did enter their search terms and limiters, they were confused as to where the search button was, as the Academic Search Premier search button is only at the top of the page near the search boxes.

*Recommendations.* User instruction might need to reinforce how to use the limiters.

*Exercise:* From the results of the search you just did, find and open a PDF full-text article.

*Testing.* To see if students recognized the PDF full text-link on the Academic Search Premier results page (Figure 4).

*Results.* 30 out of 35 students (85 percent) completed the exercise successfully. Those who did not had entered an incorrect search from the previous exercise, and the

The screenshot displays the EBSCO Academic Search Premier search interface. At the top, there are navigation links for 'New Search', 'View Folder', 'Preferences', and 'Help'. The EBSCO logo and 'Research Databases' are on the left, and the 'HUNTER COLLEGE LIBRARIES' logo is on the right. Below the navigation bar, there are buttons for 'Basic Search', 'Advanced Search', and 'Choose Databases'. A search bar contains the text 'health in Default Fields', 'and smoking in Default Fields', and 'and effects in Default Fields'. There are 'Search' and 'Clear' buttons. Below the search bar, there are links for 'Database Help' and 'Search Tips'. A message on the right says 'Folder is empty.' Below the search bar, there are tabs for 'Refine Search', 'Search History / Alerts', and 'Results'. The 'Refine Search' tab is active, showing a 'Limit your results:' section with options for 'Full Text', 'References Available', and 'Scholarly (Peer Reviewed) Journals'. The 'Scholarly (Peer Reviewed) Journals' option is checked. There are also fields for 'Published Date' with dropdown menus for 'Month' and 'Yr.' and a 'Publication' field.

**Figure 3.**  
Search: effects of smoking

results of the incorrect search had no PDF full text options. A few students clicked on the html option, others on the linked full text option.

*Recommendations.* User instruction to teach students about PDF files, how to open them, and other full text options.

### Focus groups

Eight students participated in the focus groups. The focus group questions were very general, and gathered information about students' ideas about the research process. Most notable were students' feedback about gauging the quality of a search, and help-seeking behaviors.

The researchers asked students to talk about how they determine when they have done a good search, a question which yielded interesting responses. Quite a few students stated that if the sources they retrieve are relevant to their topic, then they feel they have done a good search. One student said that she checks the publisher, and if it is an academic publication, she feels her search has returned good results. One student stated that an "exploratory" search is a good one if that search stimulates new ideas and paths to explore. At least one student replied that she was not sure when her searches were good or not, and another student said that if she was able to fulfill the requirements of the assignment at hand with resources she found, then the searches were good ones.

Students were asked "How long before you give up on a search that is not going well?". The answers ranged from a few days to as little as half an hour. One student

The screenshot displays the EBSCOhost search interface. At the top, there are navigation links for 'New Search', 'View Folder', 'Preferences', and 'Help'. Below this, there are buttons for 'Basic Search', 'Advanced Search', and 'Choose Databases'. A search bar contains the query 'health And smoking And effects and Scholarly (Peer Reviewed) Journals; Publ...'. Below the search bar, there are options to 'Add this search to folder' and 'Display link to this search'. The search results are displayed in a list format, with the first result being 'Adherence to candesartan and placebo and outcomes in chronic heart failure in the CHARM programme: double-blind, randomised, controlled clinical trial. By: Granger, Bradi B.; Swedberg, Karl; Ekman, Inger; Granger, Christopher B.; Olofsson, Bertil; McMurray, John J.V.; Yusuf, Salim; Michelson, Eric L.; Pfeffer, Marc A.. Lancet, 12/10/2005, Vol. 366 Issue 9502, p2005-2011, 7p, 4 charts, 2 graphs; DOI: 10.1016/S0140-6736(05)67760-4; (AN 19099387)'. The second result is 'IgE-mediated sensitisation, rhinitis and asthma from occupational exposures: Smoking as a model for airborne adjuvants? By: Nielsen, Gunnar D.; Olsen, Ole; Larsen, Søren T.; Løvik, Martinus; Poulsen, Lars K.; Glue, Christian; Brandorff, Nanna P.; Nielsen, Pia J.. Toxicology, Dec2005, Vol. 216 Issue 2/3, p87-105, 19p; DOI: 10.1016/j.tox.2005.07.022; (AN 19061120)'. The interface also includes options to 'Add' items to a folder and 'View Full Text'.

Figure 4.  
PDF file in search results

replied that she would stop searching for a while, then return to the search later. Another student cited inaccuracies found in information as a reason for giving up on a search, for instance, if three different sources have three different places of birth for an author that is both discouraging and confusing. Three out of 8 students specifically said that they would go to *Ask Jeeves* and do a keyword search after giving up on using other resources.

Finally, the researchers asked students where they would seek help while they are doing online research. Most students replied they would seek the help of a librarian. Three students said they would ask the help of friends, or another student. One stated that if she were in the library, she would ask a librarian, but if she were at home, she would call a friend to ask for help. Specifically, she would ask friends which keywords they had used successfully. One student replied that she never seeks the help of a librarian, but instead goes right to the Internet.

## Implications

After a comprehensive review of the above data, the Hunter College library researchers identified the following implications for the Hunter College Libraries electronic gateway pages that were studied.

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The menu bar on the Hunter College Libraries homepage provides users a way to navigate the library's web pages. The layout and design of the menu bar is simple and during the web-based exercises, students were able to find links on the menu bar with ease.

The databases gateway page is perhaps one of the most important pages on the library's web site, though the findings of this study seem to suggest that the layout for the page is not ideal. Students seemed to overlook the drop-down boxes at the top, and one major implication has to do with the overall usefulness of these drop-down boxes. Although there is an option for "search-by-type" on the databases page, students are not likely to use this option. The label is not intuitive, and students can find what they need by using a variety of other search strategies. During the focus groups, most students reported that they preferred full-text articles. Yet, during the web-based exercises, they could not figure out that they could limit their search to full text databases by using the search-by-type drop-down box. Students in the focus groups also reported that their first research step is to look for appropriate library databases. Again, this highlights the importance of a well-designed databases gateway page, as this could very well be the first place students go for electronic resources.

Overall, the Serials Solutions page works well for students. Although the researchers have no way of knowing for sure, they believe that as a commercial product, Serial Solution's usability has been widely tested and researched. Students were able to locate and use the search box to find a journal title. The Serial Solutions search options seem to be more intuitive than the browse-by-subject and browse-by-type options on the Hunter College Libraries databases page. However, the key task exercise that required students use the hyper-linked alphabetical listing at the top of the page to locate a journal by title gave students a lot of trouble. The completion rate for the question was only 54 percent. Students were much less successful trying to browse the alphabetical lists than using the search box. The alphabetical listing is not user friendly, and students found it hard to differentiate between the horizontal hyperlinks (divided alphabetically into sub-categories), which were very close together. There are more than twenty-thousand journal titles listed, and students had trouble scrolling down to find a particular title. In addition, the color of the font and the size do not stand out, making it difficult to see. These issues may be related to usability and design, as well as functionality.

Students had little trouble using the Academic Search Premier gateway page. One feature that could use improvement is the placement of the search button. Once students scrolled to the middle of the page to limit their search, some were confused as to where the search button was, and did not realize it was located only at the top of the page near the search boxes.

Students reported during the focus groups that they tend not to seek the help of the librarian, which has major implications for help features on any library resource page. Students said that although they would not ask a librarian for help, they would look for a help button on the resource pages themselves. In the web exercise that required students to locate a description of a database on the library's databases page, students missed the small orange question mark (an icon for Help). Such icons must be universally recognizable and stand out, and any help features must be visible and persistent.

### **Conclusions**

The researchers discovered that gateway pages have a major impact on students' research behavior. The Hunter College Libraries web pages, while easy to navigate for most students, could benefit from clearer labeling and more prominent icons. The

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researchers will make explicit recommendations for changes to the Hunter College Libraries web committee. The database page, one of the most important and heavily used web pages on the library web site, has drop-down menus which are not user-friendly. These menus should be either amended or deleted. Students want to know which databases are full-text, but it is difficult to determine this information from the web pages. The electronic journals link is prominent and easy to find, but it would be clearer to label this link “full-text electronic journals”. Our research has corroborated the findings of other usability studies that students do not like to scroll. The presentation of gateway pages should take this into consideration.

### Notes

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3. Nielsen, J., Why you only need to test with 5 users, available at: [www.useit.com/alertbox/20000319.html](http://www.useit.com/alertbox/20000319.html) (accessed September 27, 2005).

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### Further reading

- Krueger, J., Ray, R.L. and Knight, L. (2004), "Applying web usability techniques to assess student awareness of library web resources", *The Journal of Academic Librarianship*, Vol. 30 No. 4, pp. 285-93.

### Appendix 1. In-class exercise tasks

#### *Database grid gateway page*

- (1) Find a list of all the Hunter Library databases.
- (2) Find a description for the database "Lexis-Nexis".
- (3) Your sociology professor wants you to find articles for your paper. Find a listing of the databases available in sociology.
- (4) Your professor wants you to find articles for a paper, and you have decided to use only online full-text articles. Using the library's web pages, find a list of all the Hunter College Library full-text databases.

#### *Serials solutions gateway page*

- (1) You are beginning your research paper and want to know which journals are available to you online. Go to the page where you might be able to find this information.
- (2) Your classmate told you about a great article in the online journal called "American Literature". Find out if the library has this online journal.
- (3) Your classmate also told you that the article mentioned in the previous exercise was published in 2005. Find a listing of all the full-text articles published in "American Literature" so far in the year 2005.
- (4) You are doing a paper for a Business/Economics class, and you would like to find out which online journals are available only in that subject area. Using the library's electronic journals page, find a list of these journals.
- (5) Without using the search box at the top of the page, find the online journal called "German Quarterly."

#### *Academic search premier*

- (1) Your professor wants you to find articles about the effects of smoking on one's health. On the search page for Academic Search Premier, type the word "health." In the second search box, type the word "smoking," and in the third box type the word "effects." Limit your search to articles from scholarly peer-reviewed journals, beginning in 2003 and ending in 2005. Hit the search button once you have all the information entered.
- (2) From the results of the search you just did (above), find and open a pdf full-text article.

### Appendix 2. Focus group questions

- (1) When using a Hunter College Libraries database, are you likely to limit your search to full-text articles? If yes, why are you likely to do this?



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- (2) What might be the drawbacks of only searching for full-text articles?
  - (3) When you begin research for a paper, what are the very first steps you take?
  - (4) How do you know when you have done a good search?
  - (5) How long before you give up on a search that is not going well?
  - (6) If you decide to seek help while conducting your research, where do you go?
  - (7) Have you ever used an Internet search engine for course-related research?
  - (8) On average, how much time do you spend using the library's electronic resources at any given sitting?

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