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How Presentation of Electronic Resource Gateway Pages Impact Student Research Behavior

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Author Biographies

Lisa Finder is currently Assistant Professor and Serials Librarian at the Hunter College Libraries. From 1994-2000, she was a librarian at the New York Public Library's Schomburg Center for Research in Black Culture. She has an M.A. from the Graduate Center, the City University of New York and an M.L.S. from Columbia University. Her research interests include Caribbean literature, African American history, and information-seeking behavior.

Valeda F. Dent is currently Assistant Professor and Head, Reference Division, Hunter College Libraries. Previous positions include Project Director for the MALIBU digital library project in London, United Kingdom, and adjunct faculty at the University of Michigan's School of Information. She holds an M.S.W from the University of Michigan School of Social Work and an M.I.L.S. from the University of Michigan School of Information Science. Her research interests include agent technology, and rural libraries and literacy. She is the author of several articles, and has been published in journals such as *Libri*, *Research Strategies*, *College and Undergraduate Libraries* and *Reference and User Services Quarterly*.

Brian Lym is Assistant Professor/Reference-Instructional librarian at Hunter College. Previously, he was on the library faculty of City College of San Francisco. Brian has also served as the chief technical information officer for the United States Forest Service's Pacific Southwest Research Station and was the user services librarian at the California Academy of Sciences and associate librarian at the the San Francisco Botanical Garden. He is an active member of the Association of College and Research Libraries of the American Library Association, and recently served on the board of the California state chapter of ACRL. He holds an M.L.I.S (Master of Library and Information Sciences) and M.S. (Wildland Resource Science), and B.A. (Humanities) from the University of California, Berkeley.

Structured Abstract - How the presentation of electronic resource gateway pages impacts research behavior

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Research Paper

Keywords: Electronic journals, student research behavior, user studies, Web usability, Web layout

Purpose

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.

Methodology

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. Finally, a survey of information and library science graduate students was conducted. The combined qualitative data from the focus groups, survey and key task exercises provided an overview of how students used certain library gateway pages for their research, as well as what they thought about research in general and their past experiences using electronic library resources. 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, Nielsen 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% (37%-73%) 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% of the students. The focus groups of undergraduate students indicated a preference to use periodical databases as an initial research step, along with a preference to give up on a search that was not successful. In contrast, graduate students revealed they would persist in carrying out a search, and would pursue strategies for successful completion.

Research Limitations/Future Research

The impact of the research is limited by the size of the study, which is small. However, usability experts agree that a small group of users testing a site (4-5) can uncover the majority of usability concerns. Future research might involve testing a larger, more diverse group.

Practical Implications

The information presented in this article offers some basic considerations in terms of the layout and presentation of gateway pages for electronic library resources. These pages are of critical importance during the research process, as they are often among the first few clicks that a novice user makes. The article also presents some measures that might be taken to make these gateway pages more user-friendly, self-explanatory and easier to navigate.

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. By focusing in this manner, the researchers hope that the information presented can be helpful to librarians and other professionals who are trying to guide users virtually in their quest for information.

How the presentation of electronic gateway pages impacts research behavior

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, impact 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 "uninitiated" (Cobus, 2004) user something about the library that might later facilitate their research.

One important objective of the 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. In other disciplines such as medicine and psychology, validating test instruments is necessary to ensure quality control in data collection; similarly, validation of information literacy assessment instruments must be made prior to any measurement of user's information literacy skills. 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 impact their next steps in the research process.

The literature presents a wealth of research on the impact of electronic resources on research behavior. Presentation of those resources on the screen frequently falls under usability, and while this study is not strictly a usability study, it is meant to inform librarians about the impact of certain usability aspects on the research behavior of users.

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 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. 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.

Electronic Journals: From Innovative Format to Mainstream Media

The three components of the Hunter College electronic information environment that we are examining are the Hunter College Libraries database grid (Figure 1), the Serials Solutions A to Z pages (Figure 2), and the Academic Search Premier advanced search screen (Figure 3).

TAKE IN FIGURE 1

TAKE IN FIGURE 2

TAKE IN FIGURE 3

Each of these is a gateway to searching for scholarly electronic journal articles. Before electronic journals were a dominant player in the academic library, students and faculty knew where to go to access their favorite journals. They would come into the library to browse the current periodicals shelves for recent issues, or go to the bound shelves for the older issues. As in many academic libraries, journals do not circulate at Hunter College Libraries. Researchers knew that they would have to photocopy the article if it was too long to read in one sitting, or would be needed later as a reference. These days, researchers come to the library to browse the print issues less often. More often, they use databases, often remotely, in order to search for articles on specific topics. In addition to this phenomenon of less physical traffic to the library, the introduction of electronic journals has been accompanied by quite a bit of confusion about where and how to access these e-journals. E-journals have also added an array of options for users, and this can add to users' frustration.

A primary concern for Hunter librarians is making these initial points of contact with electronic resources "user-friendly." At the 2000, North American Serials Interest Group (NASIG) conference, Allan Scherlen discussed remote access of electronic resources. He noted that students may use the more familiar search engines such as *Ask Jeeves* instead of taking advantage of the subscribed resources available through their library's Web pages. (Whiting, 2002). Because electronic journal articles often have hypertext links within the main body of the article as well as in the reference sections, users have many options with which to pursue their research. Searching and browsing occur on many planes.

There have been tremendous improvements in recent years in the multimedia capabilities of electronic journals as well as speed of distribution and access. Tomlins observed seven years ago that electronic journals would remain an important part of the online landscape in academic research and that we were likely to see "sophisticated forms" of this format "currently unimaginable (Tomlins, 1998, p. 7). College students who do most of their research on popular search engines are deprived of valuable resources. This type of research behavior may occur because students are unaware of the multitude of resources on the library's Web site, or they may simply feel more confident with their research skills with Internet search engines with which they are more familiar (Krueger, et al., 2004) than with the library's subscribed resources.

To ensure that students at Hunter do the best and most efficient searches, it is important to promote the library Web pages. Whether their particular research needs are best met by print or electronic resources, the OPAC and database pages are appropriate places to do scholarly research. To this end, Hunter librarians urge students to use the resources on the library's Web pages as often as possible

Periodicals at Hunter College Library (2000-2005)

In 2000, Hunter College library began a review of the current periodicals collection with the goal of canceling ten per cent of titles. To accomplish this, the chief librarian solicited input from the academic departments in order to identify titles which might be candidates for cancellation. Since 2000, the library has had a standing policy that if an academic department wants to order a new journal, another journal title of greater or equal value must be cancelled. This allows the library to deal with the increasing price of periodicals and the impact of this inflation on the library's monograph budget.

As in all academic libraries, the number of electronic journal titles to which Hunter has subscribed has skyrocketed in recent years. This plentitude has added value to the library's collections and services, but has not eased the financial burden of serials on the overall library budget. While the college has taken advantage of the buying power of consortial arrangements, overall it has been difficult to keep the costs of serials, both print and digital, at a manageable level.

Consortial pricing for electronic journals is important at a time when institutions are struggling to get the most bang for their economic buck, and the Hunter College Libraries subscribes to several e-journal packages through consortial

arrangements. Some of these packages have been arranged with other City University of New York campuses, and some have been negotiated through consortia outside of CUNY including NYSHEI (New York State Higher Education Initiative), WALDO (Westchester Academic Library Director's Organization), and NYLINK.

Because of the convenience of the format, researchers prefer to access journals electronically. Electronic journals are also convenient for libraries: they do not take up space in the library and do not need to be bound, saving the library labor and money. For these reasons, and because there are far fewer titles for which the digital version is free with the print subscription, Hunter has been dropping print subscriptions in favor of their electronic versions. Faculty in the sciences and mathematics have been comfortable with this format for many years, while their colleagues in the humanities and social sciences have been slower to adapt.

The transition from print to electronic for many of Hunter's journal titles has meant some adjustments to technical services operations. The "Current Alerts" service, a service for faculty in which the library provides photocopies of tables of content (TOCs) pages of new issues of journals which are of particular interest to faculty, has been reduced from a list of 194 journal titles to a considerably downsized list of 37 journal titles for which no online TOCs are available. Most journal publishers now offer electronic alerts for the tables of content of journals which can be delivered directly to the e-mail inbox of researchers. Hunter librarians have encouraged faculty to set up electronic alerts with journal providers where available. Many members of the Hunter faculty have taken advantage of the speed and convenience of e-alerts, as well as the added value of direct links to full-text articles which electronic alerts provide. End-users can implement electronic alerts services for themselves much more quickly than the library can produce TOC photocopies. This change in service has meant that many new issues of journals are on the shelves faster because they no longer need to be set aside to be photocopied.

In 2000, Hunter College Libraries offered access to twenty-five databases, mostly in the fields of science, technology and mathematics. During the 2000/2001 academic year, the Hunter College Libraries serials librarian attempted to maintain an electronic journal Web page by manually adding links to an alphabetical list of electronic journals on the library's Web site. This was a challenging and crude method of tracking the hundreds of e-journals to which Hunter subscribed. In the fall of 2001, Hunter subscribed to 32 licensed databases, and the library began subscribing to the A to Z html and paper lists from the vendor *Serials Solutions* in order to keep track of the Libraries' electronic resources. With this new system, updated reports were received every two months. This A to Z list was mounted on the Hunter library server until 2004, when Serials Solutions introduced their E-Journal Portal. The portal, accessible from the Hunter Libraries' Web pages and branded with the Hunter College logo, is hosted on the vendor's Web server and updated daily. As of the fall of 2005, Hunter subscribed to 125 databases, and the Hunter College community has access to over 22,000 journals through Hunter's *Serials Solutions* Web pages.

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" [1] (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) [2] 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 important instructions provided on the electronic gateway pages may be of more use to the researcher.

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% of users followed links from the online catalog; 7% used the e-journals Web page; 12% used an internal list of e-journals; and 41% 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 users' research activities 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 designing information-rich pages, specifically library Web pages, that are meant to support a diversity of academic research. Krug (2000, 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 observed 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 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, and they 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.

Methodology

The methodology for the study involved gathering data from users in three different ways: in-class library exercises, focus groups and a survey. Thirty-eight undergraduate students took part in the exercises, and 8 students (7 undergraduate students and 1 graduate student) participated in the focus groups. In addition, the researchers surveyed a group of 15 library school students to get a sense of the research behaviors of those who might be considered "more sophisticated users."

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 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 three components of the Hunter College Libraries electronic environment for examination during the study were identified. They were: The Hunter College Libraries database grid; the *Serial Solutions* access page; and the *Academic Search Premier* database. 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 research questions to be used to guide the inquiry for each of the above three components were developed. A total of 16 questions were created. Table I presents the three components and the related questions.

TAKE IN TABLE I

Finally, from these questions, the researchers had to come up with the in-class exercises (using the library's Web pages) and questions for the focus groups. Appendix I presents the in-class tasks and Appendix II 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 involves users performing some type of exercise to demonstrate their understanding of a Web site's function and purpose. The Hunter study used key task testing by having users perform the exercises in Appendix I. Usability guidelines suggesting the number of users to test were also used for this study. 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% of a site's problems will be uncovered, and if 15 users are tested, closer to 100% 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.

Interpretation of what users did during the exercises was the final step in relating user feedback to presentation issues. Previous usability studies have used a variety of methods to examine user feedback. One study looked at how efficiently users were able to complete exercises by counting the number of clicks or the amount of time spent on each task (Augustine and Green, 2002). Another study examined how successful users were in completing the assigned tasks (McGillis and Toms, 2001). Yet another study looked at users self-reports on how easy or difficult it was to use certain Web pages in combination with error logs (Battleson et al, 2001). The researchers in this study looked at efficiency by examining the Camtasia captures for each user and recording how many clicks it took users to complete tasks, and also reviewed the recorded sessions of the focus groups.

Results

The following section presents the results for each of the three methods used to gather data: the Web exercises, the focus groups, and the survey distributed to graduate-level library school students.

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%) 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 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 (Figure 5).

Results: 25 out of 35 (71%) of students completed the exercise. Most of the students who did not 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 Lexis- Nexis 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: 10 out of 35 (28%) of 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%). 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, typed in no 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, to help them determine the format of material.

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%) 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 (Figure 6).

Results: 33 out of 35 students completed this exercise (94%). 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%) 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.

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%). 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%). 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 7).
Results: 29 students completed this exercise successfully (82%). The three students who did not 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 8).

Results: 30 out of 35 students (85%) completed the exercise successfully. Those who did not had input an incorrect search from the previous exercise, and the 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 of the students stated that they are likely to search for full-text articles. They stated that full-text is more convenient and easier to use than print journals. When asked about the drawbacks of searching for only full-text, students replied that finding too many irrelevant articles, articles that were too long, and having to go through too many results as potential challenges.

The researchers were interested in finding out the very first steps students take when beginning their research. Students gave a variety of strategies for beginning the research process. A few stated that they would go directly to databases such as Academic Search Premier and LexisNexis. One student stated that she would seek the advice of a librarian. Another student replied that she would begin by querying the PsychInfo database as it would be the most pertinent to her major (Counseling/Education). Finally, two students replied that they would consult the library's catalog, CUNY+, first. A few of the students mentioned that they would do keyword searches in the relevant resources.

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 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 they would go to Ask Jeeves and do a keyword search after giving up on using other resources.

The researchers asked students where they would seek help while they are doing 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.

When asked which search engines they had used for research, students mentioned Google, the AOL search engine, Ask Jeeves and Yahoo! At least one student stated that she did not use Internet search engines for research because she was not sure about the reliability of the sources. The follow-up question to this was whether or not the students were satisfied with the results they got from the search engines they had named. Students stated that their results depended on the topic they were researching, and some topics had better results than others. One student said that she was satisfied with the results about 15% of the time, while another said that he was satisfied most of the time. One student mentioned that the results were often mixed with commercial information, and that she could not be sure of content validity.

Finally, when asked how long they spend doing research in library databases in one sitting, students reported that they spend between half an hour and 2 hours at one time.

Surveys of Graduate Students

An informal survey of graduate students in a New York City library school class showed some interesting contrasts as well as similarities with the Hunter students from the two focus groups. The researchers asked this group of 16 graduate students five questions about their research behavior in the electronic environment (Appendix III). The first question the researchers asked them was, "How do the different database interfaces and search options influence your research?" Most of these students mentioned a preference for the simplest, most direct interface. One student stated that she looks for an appropriate database with many search options. Four students said that the interface is not nearly as important as the content. These students are willing to manage a complicated interface if the content is what they need.

The researchers asked whether these graduate students were inclined to browse electronic journals. The majority answered that they do not browse the table of contents of electronic journals. They are more likely to do targeted keyword searches in databases. Only four of the students said that they take the time to browse electronic journals as this can often be an opportunity for serendipitous discoveries. One student mentioned that she always chooses the print version for leisure reading.

The next three questions that we asked these graduate students were the same as three of the focus group questions that we had asked the Hunter students: "When using databases, how do you know when you've done a good search?" The majority of students answered that if they retrieved a moderate number of results with high relevance, they knew their search was good. A few students mentioned that the search was good if they set up the search string correctly using the logic and search terms of the database.

The researchers asked these students how long before they would give up on a search that was not going well. Unlike the undergraduates in our focus groups, most of these graduate students will never give up on such a search. Many of them will continue the search later when they are less frustrated and try different search terms. Three of the library school students, however, said they would give up after 15-20 minutes.

When asked about what steps they might take to seek help while conducting research, these graduate students gave a wide variety of answers. Half of this sample of graduate students reported that they were likely to eventually consult a reference librarian for research help. Five students said that they are likely to consult a colleague; one student said that he would be likely to consult online help in the database because person-to-person help takes too long and does not usually resolve the problem. In contrast, another student said that he would ask a reference librarian because online help screens do not provide much assistance. A couple of students reported rarely asking for help because it had not been necessary. Three students mentioned that the Google search engine has been helpful.

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.

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 for students. Researchers assume that as a commercial product, Serial Solution's usability has been widely tested and researched, and as a result, the layout of the initial gateway page works well for students. 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 Web 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.

Finally, students in the focus groups reported that they use Google for research quite frequently. Specific examples included a research project for an advanced biology project, a paper for a women's studies class, and a paper for a first-year English course. This highlights the degree to which Google and other search engines have been integrated into the research process of students. A Google-like interface for library gateway pages with such features as the "Did you mean...?" prompt when a spelling error occurs might be a way make student users feel more comfortable when using the library's electronic resources.

Conclusion

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 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.

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Appendix I 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 II 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?
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?

Appendix III Survey Questions for Library School Students

1. Different databases have different interfaces and search options. How does this factor influence your research?
2. Do you take the time to explore electronic journals (for example, do you look at the table of contents of recent issues online and follow links to relevant articles?)

3. When using databases, how do you know when you've done a good search?
4. How long will you spend on a search that is not going well before giving up?
5. If you decide to seek help while conducting your research, what steps might you take to get help? Where might you go for help?

Table I Hunter College Libraries Electronic Gateway Components

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?

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?

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 student interpret the results they get – is something available full text, pdf vs html, etc.?

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

Archives/Special Collec.
Blackboard
Hunter College
CUNY Libraries
CUNY Portal

GOT A REFERENCE QUESTION? TRY



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.

Browse by Subject

Select Subject... Go

Browse by Type

Select Type... Go

Browse by Title

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 All

Click on the icon for a brief description of the database.
Databases in red, purchased with Technology Funds.
Databases in green are public/free Web resources and do not require login.

Alphabetical List (A-H)

Alphabetical List (I-Z)

Academic Search Premier		Informa	
AccuNet/AP Photo Archive		Infoshare	
All-Press Watch		Institute of Physics - Electronic Journals	
America: History & Life		Internet Library of Early Journals	
American Chemical Society		JSTOR	
American Civil War: Letters and Diaries NEW!		Kraus Curriculum Development Library	
American FactFinder		Latin America Data Base	
American Film Scripts Online NEW!		Learn-A-Test Learning Express Library	
American Humanities Index		Lexis/Nexis	

Figure 1 Hunter College libraries database



[E-Journal Home Page](#) | [Library Home Page](#) | [CUNY+](#) | [Help](#)

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+.

Note: Access Electronic journals using any Hunter College computer (or off-campus using your Hunter College Proxy Server id and password).

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

1 record retrieved for the search: Title begins with "American Literature"

American literature (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 & 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

[Back to top](#)

grid

Figure 2 Serials Solutions A to Z journals

EBSCOhost - Microsoft Internet Explorer

EBSCO Research Databases [New Search](#) | [View Folder](#) | [Preferences](#)

Basic Search | Advanced Search | Visual Search | Choose Databases

Sign In to My EBSCOhost | Keyword | Publications | Subject Terms | Indexes | Cited References | Images | Language

Find: in Search Clear ?

and in

and in

in Folder is em

Refine Search | Search History / Alerts | Results

Limit your results: [Limiters](#) | [Expanders](#) | Res

References Available

Scholarly (Peer Reviewed) Journals

Published Date Month Yr. to Month Yr.

Publication

Figure 3 Academic Search

Address <http://library.hunter.cuny.edu/>

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

Archives/Special Collec.
CENTRO
Hunter College
CUNY Libraries
CUNY Portal

GOT A REFERENCE QUESTION? TRY
[Ask a Librarian](#)

HUNTER COLLEGE LIBRARIES
OF THE CITY UNIVERSITY OF NEW YORK






Click the images for more information about the Hunter College Library Campuses

Finding An Article

- [Selecting a Database](#)
- [Conducting a Search](#)
- [Obtaining an Article](#)

Library Information

- [Hours](#)
- [Floor Maps](#)
- [Renewals/MyCirc](#)
- [Library Policies](#)
- [Library News](#)
- [Staff Directory](#)

Click here to download
EndNote
to your computer

Finding A Book

- [Checking CUNY+](#)
- [Reading Call Numbers](#)
- [Using Other Libraries](#)

Specialized Services

- [Course Reserves](#)
- [Disabled Students](#)
- [Faculty Services](#)
- [Graduate Students](#)
- [Ask-A-Librarian](#)
- [Turn-it-In](#)

Premier

Figure 4 Hunter College libraries home

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
 Archives/Special Collec.
 CENTRO
 Hunter College
 CUNY Libraries
 CUNY Portal

GOT A REFERENCE QUESTION? TRY
 Ask a Librarian

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.

Browse by Subject
 Select Subject... Go

Browse by Type
 Select Type... Go

Browse by Title
 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 A-Z

Click on the icon for a brief description of the database.
 Databases in **red**, purchased with Technology Funds.
 Databases in **green**, purchased with General Funds.

Alphabetic:
[Academic Search](#)
[AccuNet/AP Plus](#)
[Alt-Press Watch](#)
[America: History & Life](#)
[American Chemical Society](#)
[American Civil Liberties Union](#)
[American Factbook](#)
[American Film Institute](#)
[American Humanities Index](#)

Lexis/Nexis
 Full text database of newspapers and other news sources; legal information including U.S. Code, state laws and reviews; business news and company financial information; medical abstracts, biographical information and country and state profiles.
[Link](#)
 Type: Full-Text

Windows taskbar: Done, Internet

Navigation icons: A vertical column of question mark icons on the right side of the Lexis/Nexis window, with an arrow pointing from the Lexis/Nexis link in the Alphabetic list to the first icon in the column.

page

Figure 5 LexisNexis

[E-Journal Home Page](#) | [Library Home Page](#) | [CUNY+](#) | [Help](#)

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+.

Note: Access Electronic journals using any Hunter College computer (or off-campus using your Hunter College Proxy Server id and password).

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

Title begins with

-- Please select a subject category --

1 record retrieved for the search: Title begins with "American Literature"

American literature (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 & 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

[Back to top](#)

description

Figure 6 Serials Solutions ejournals

EBSCO Research Databases [New Search](#) | [View Folder](#) | [Preferences](#) | [Help](#)

Basic Search Advanced Search Choose Databases

Sign In to MyEBSCOhost Keyword Publications Subject Terms Indexes Language

Cited References Images

Database: Academic Search Premier

[Database Help](#)

Find: in

and in

and in

[Search Tips](#)

[Folder is empty.](#)

Refine Search Search History / Alerts Results

Limit your results: [Limiters](#) | [Expanders](#)

Full Text

References Available

Scholarly (Peer Reviewed) Journals

Published Date Yr: to Yr:

Publication

search

Figure 7 Search: Effects of smoking

The screenshot shows the EBSCOhost search interface. At the top, there are navigation links for 'New Search', 'View Folder', 'Preferences', and 'Help'. The EBSCOhost logo is on the left, and the HUNTER COLLEGE LIBRARIES logo is on the right. Below the logos are buttons for 'Basic Search', 'Advanced Search', and 'Choose Databases'. A search bar contains the text 'health', 'smoking', and 'effects' with 'and' operators. Below the search bar are buttons for 'Search' and 'Clear'. The search results are displayed in a table with two columns: 'See: All Results' and 'Academic Journals'. The first result is 'Adherence to candesartan and placebo and outcomes in chronic heart failure in the CHARM programme: double-blind, randomised, controlled clinical trial'. The second result is 'IgE-mediated sensitisation, rhinitis and asthma from occupational exposures: Smoking as a model for airborne adjuvants?'. Each result has a 'PDF Full Text' link and an 'Add' button. The interface also includes a 'Folder is empty' message and a 'Limiters set' indicator.

EBSCO Research Databases | Basic Search | Advanced Search | Choose Databases | HUNTER COLLEGE LIBRARIES

Sign In to My EBSCOhost | Keyword | Publications | Subject Terms | Indexes | Language

Searched: Academic Search Premier for *health And smoking And effects and Scholarly (Peer Reviewed) Journals; Publ...* | Add this search to folder | Display link to this search

Database Help

Find: health in Default Fields | Search | Clear

and smoking in Default Fields

and effects in Default Fields

Search Tips | Folder is empty.

✓ Limiters set | To store items added to the folder for a future session, Sign In to My EBSCOhost

Refine Search | Search History / Alerts | Results

1 - 10 of 929 Pages: 1 2 3 4 5 Next | Sort by: Date

See: All Results | Academic Journals

1. [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)
[Cited References \(53\)](#) | [Times Cited in this Database \(1\)](#)
[PDF Full Text](#) (124K) | [Add \(1-10\)](#)

2. [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) | [Add](#)

Figure 8 PDF file in search results