Beyond the Internet:
Integrating Print, Electronic and Web Resources
for Users on The WWW Gateway to Information

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Abstract

Researchers in modern libraries, in their excitement with the new Internet-capable computer workstations, may now easily overlook millions of less glitzy print resources. How can libraries guide users to the most relevant information resource, regardless of format, for their information needs? The WWW Gateway to Information, a computer system created by The Ohio State University Libraries, addresses the total research needs of users of the modern library. The WWW Gateway guides researchers to titles and abstracts for hundreds of print, CD-ROM, online and Internet resources. Titles are presented in a search strategy format to organize resources in a range from general to specific information. Links to search electronic and Internet resources are also provided. Workshops, staff intervention and instructional brochures are not needed. Evaluations from focus groups of undergraduates, library personnel, and classroom faculty have helped develop a research tool which helps researchers become independent information users.
“Our greatest professional ethical responsibility is not to preserve any particular medium of information transfer--print or otherwise. We are not primarily defenders of books or any other information medium....We are librarians. We have a unique professional ethic. We inform. Our mission is to serve the minds of our clients, to provide the information and knowledge they want and need as effectively as our professional judgment and resources can achieve. Both electronic and print tools have their place in the array of tools we use to achieve our goals. But the tools do not set the goals. The goals set the tools.”

Introduction

The honeymoon period is ending for the Information Age. After an initial period of excitement, many librarians and researchers are now experiencing the darker side having large amounts of electronic and other resources available. The addition of new titles to menus on library public computers is no longer greeted with unbridled enthusiasm, but is now often viewed with caution. The sheer number of choices and search commands threatens to overwhelm librarians trying to keep current with the latest materials as well as users forced to sort through more and more materials daily.

If fifty elephants at a circus are perceived by the public to be fifty times more exciting than one elephant, one million elephants may not likewise be viewed by the public or circus administrators as one million times better. Despite the impressive image this many elephants makes, they bring logistical problems of management and maintenance to those who attempt to harness their strength.

Libraries in the Information Age now face a task similar to corralling large numbers of elephants and then providing the means for the public to inspect and interact with them. Where once a library offered users a single card catalog, it now provides access to hundreds of online catalogs from other institutions around the world. A limited number of stand alone databases have been replaced by a multitude of networked databases available from any library computer or personal workstation. Librarians, anxious to take advantage of the new technology and resources, continually add new selections for public use until staff and users alike grow overwhelmed.

Recently, many libraries are expanding their technology to offer the public access to the biggest herd of elephants imaginable: the Internet sites. Users know these sites are available and demand these resources be made available to them. But coping with the quantity of these sites, much less their quality, is a staggering task for librarians and users alike.

Due to availability of Web information sites, research techniques for the novice library user are undergoing a change. Just as the user-friendly InfoTrac became widely popular with the public and used as a primary research tool, users of Web sites exhibit similar behavior by overlooking or ignoring other resources in less exciting print and electronic formats.

User Selection of Resources

To achieve success in research today, users must have a clear understanding of their information need and the resources available that best address that need. They must be able to decide whether they need print index, an electronic database, a full-text electronic journal, or an Internet site. Once they have determined the resource type, they need to identify a specific item that addresses their topic. Next, they have to locate the item in the library, search its contents, and evaluate its usefulness. For users of a major library, these can be a challenging tasks.
But are today’s users up to these tasks? Novice researchers have difficulty deciding between using the online catalog or a periodical index to identify articles. Faced with tables of print indexes and menus of electronic databases, users often must rely on guesswork to pick a resource to search. Users may choose an item based on its promising title, because they used it in previous research, or because it was recommended by a peer or a workshop. It is no matter that this resource may not have relevant information for the topic; in the novice user’s mind a resource has been identified. It is a lifesaver thrown to someone drowning in information, something the person hopes will save him by providing some sort of help.

Libraries today add to the user’s selection difficulties by offering access to millions of Web sites. Web search engines such as Yahoo and Lycos can identify thousands of sites in response to a keyword search. Simply scrolling through such a list of sites, much less linking to them to check each one for relevance is a time-consuming, frustrating task.

Evaluating these Web sites offers new challenges. The traditional of accuracy, authority, objectivity, currency, and coverage are often difficult to determine for a Web site. Anyone of any qualifications can create a Web site without subjecting the information to review by editors. Publication or updating information may not be available. In addition, search engines retrieve advertising, entertainment and personal pages in their recommended titles lists, further confusing users seeking reliable information sites. Inexperienced researchers, faced with the millions of Web sites, may not be able to distinguish the quality sites from the questionable ones.

Some librarians feel users may never be able to evaluate relevant Web materials without help. “[E]ven if vast numbers of citizens had access to the Internet, they would be ill-equipped to use it due to a widespread absence of critical thinking skills.... [U]nless librarians are involved in the evaluation of on-line information, the population will drown in it.”

Role of Librarians

Clearly as the availability of print, electronic, and Web resources expands, users continue to need assistance to identify, locate, and evaluate materials. Some users rely solely on InfoTrac, Lexis/Nexis or a Yahoo search of the Web for all their research because those are the tools with which they are comfortable. They ignore other resources simply because they lack the time and critical thinking skills to sort through the mountain of available materials. Users need to understand the resources available to them, the advantages each resource type offers, and view a list of core titles on their topic to avoid one-dimensional research.

Librarians have a long history of helping users identify, find and locate relevant information in the best format to meet their information needs. Printed pathfinders and bibliographies designed by librarians have guided users for years to relevant, topical information. Reference librarians daily have assisted users understand the advantages of an online catalog over the card catalog and when to use InfoTrac, Readers’ Guide to Periodical Literature, or Periodical Abstracts.

Librarians have no hidden agenda for recommending one format over the other. Their only goal is to provide both the best resources to their users and the professional assistance necessary successfully search these resources. They are ideally equipped to assist users with the current glut of information.

But this Information Age occurs simultaneously with the Age of Shrinking Budgets. Libraries everywhere are tightening their belts to continue to provide more services with less money and fewer people. Funding is available for new technology, but not for an expansion of staff to maintain this technology. Overloaded staff members do not have time to become proficient using new technology and are thus not equipped to assist users with hands-on instruction. Thus, as more
information resources are made accessible to the public, fewer librarians are available to offer individual help or teach workshops.

Other traditional methods of providing instruction are no longer possible in a downsized library. One-on-one instruction and instructional workshops are staff intensive and reach only a small percentage of users. Brochures, while inexpensive to produce, are difficult to maintain and update.

A library today needs a systematic approach to assisting users identify, find, and evaluate materials. This new approach must reach a wide audience, be easily modified to address ongoing changes and not require ongoing commitments by staff to make it succeed.

The creation of such a system was the goal of the Ohio State University Libraries as they tried to expand their audience base and instructional services in the 1980s and again in the mid-1990s.

The OSU Environment

The Ohio State University campus is the largest campus in the United States. The 50,000 OSU students have access to nearly 5 million volumes, 30,000 periodical titles, and 2.5 million microforms. The University Libraries’ collection is housed in 44 department libraries and collections throughout the campus. Approximately 90 librarians oversee these departments, along with 140 staff members and numerous student workers.

Currently, University Libraries users have access to approximately 150 networked and stand alone databases. Users can search Ohio State’s online catalog, OSCAR (Ohio State Catalog for Automated Retrieval), and other catalogs including OhioLINK (a state-wide consortium of 40 Ohio libraries), CIC (Big 10 libraries), MELVYL (University of California), Library of Congress, and WorldCat. In addition, the Libraries now provide access to the Internet from most public computers.

The Office of User Education coordinates instructional efforts throughout the Libraries. Each year, 25,000-30,000 students receive some form of bibliographic instruction through workshops, course-related instruction, the freshman library assignments, and tours. As large as this User Education program is, however, it reaches only half the students at Ohio State.

Development of The Gateway to Information

Back in the mid-1980s, the Office of Library User Education examined ways to expand the program to reach a larger audience. Budgetary restrictions at that time meant adding a new position to the office was out of the question. Workshops attendance was down. Print brochures were already flooding the Libraries. It was clear that to reach a larger audience, a significantly new direction to user instruction in the Libraries beyond workshops and brochures was necessary.

At that time, Virginia Tiefel, former Director of Library User Education, felt computers could provide consistent access and instruction to address core informational needs of novice researchers. Such a computer system was envisioned to be a user-driven project designed to help research novices successfully identify, find and evaluate relevant resources regardless of format. The Gateway to Information, as the project was named, would provide access to major databases and the online catalog, as well as information about the individual libraries such as addresses, hours, collection description, floorplans and campus maps.

The project was funded by four grants from the Department of Education and the William Randolph Hearst Foundation. Tiefel was the principal investigator and worked with the head of Library Automation, a senior programmer, and the other User Education librarian as the Gateway
Development Team to move the project forward. Three consultants from Ohio State Four as well as four outside consultants provided suggestions for the project. Advisory teams for technology, design, and functions/narrative were created to get ideas from Libraries’ staff and faculty.

The first version of The Gateway was made available on public computers in the Main Library in Fall 1989. This Macintosh system used HyperCard programming to create a graphical interface which could easily be updated or modified. By 1992, The Gateway was available on 59 computers throughout the Libraries, serving as the primary information system for the public to access the online catalog, electronic indexes, and other library information.

More importantly, The Gateway guided users to hundreds of relevant print encyclopedias, periodical indexes, as well as statistical, biographical, and review resources and the online catalog. User viewed recommended titles by selecting the type of resource (e.g., “encyclopedia,” “periodical index,” etc.) and then viewing titles for a subject area (e.g., “advertising,” “sociology,” etc.). Known titles were accessed via the alphabetical list on the opening page. [See Figures 1]

Each recommended title had a corresponding “source card” screen with descriptive information about that resource to help users evaluate its relevance and usefulness. Source cards included a call number, publication or coverage date, abstract, and location in the University Libraries. Users could also view information about each library that held this resource. The collection description, address, hours, floorplan and campus map helped users easily locate the resource in the Libraries.

Eighteen CD-ROM titles were integrated with the recommended print materials. The Gateway did not separate electronic resources into their own section. Such a hierarchy would violate the original design principle to guide users to the best resources regardless of format. An item such as Social Sciences Index was linked to a source card that described both the print and electronic versions of this index. In addition, users could click on a button to connect to the electronic version.

To help students use the databases to which they had been led, Gateway programmers provided a custom interface for all databases and the online catalog. Users accessing the Libraries’ catalog or any database from UMI, Wilson, SilverPlatter, or Grolier would see a common screen layout with buttons to click on and a standard display of search results. Basic searches in these databases by subject and keyword no longer needed brochures or one-on-one instruction from Libraries’ staff.

The Gateway was a user-driven system, responding to suggestions from researchers as to design, technology, and content. To understand what users wanted, evaluations were collected from the earliest days of The Gateway. Users could fill out comment forms for information regarding their search topic, amount of information found, ease of use, screen layout, and suggestions.

Over 8,000 evaluation forms over five years showed The Gateway was very well received by students. Over 77% of students were very or mostly successful with their searches, and 83% indicated they would use The Gateway again for research. Comments from Ohio State users of The Gateway included:

* What a wonderful resource for our students! Bodes well for OSU students who will be light years ahead with this. (English Professor)

* This will be very useful for my doctoral students who are learning to review the literature. Excellent possibilities! (Director OSU Center for Teaching Excellence)

* A great source for information. Excellent for weeding through the OSU library maze. (Undergraduate student)
* Thanks for simplifying the access to research material. You are making the education experience more enjoyable. (Graduate student)

User comments also showed The Gateway helped users find materials through serendipity. By showing a variety of titles recommended by library subject specialists and organizing the materials into a search strategy, The Gateway broadened the research experience for novice and experienced library users alike. These users could see beyond the familiar resources of books and periodical articles to view relevant statistical materials, biographies, reviews, and bibliographies not previously known to them.

* Found everything I wanted initially and more information I realized I needed. (Graduate student)

* It’s highly useful as both a learning tool and access instrument. (Faculty member)

* Excellent way of learning to use the system. You don’t really have to learn, you are carried through your task. (Undergraduate student)

The Gateway was also the primary tool used in the Freshman Library Instruction Program. Each year, 10,000 incoming freshmen and transfer sophomores complete two library assignments introducing them to the online catalog, print and electronic databases, and a search strategy. Using The Gateway, these students could complete most of the research for their introductory assignments from a single workstation. Also, most students did not require staff help or instructional brochures to search databases such as ERIC, Social Sciences Index, or ABI/Inform. Questions to the Undergraduate Library reference desk regarding how to search the online catalog were reduced by half during the first quarter when The Gateway was available.

Limitations of the Macintosh Gateway

The Macintosh Gateway, although successful in many areas, had limitations. First, it was restricted to the Macintosh/HyperCard operating system. Second, even with a Macintosh computer, The Gateway required expensive, locally-mounted software to read and front-end the DOS-based databases. Third, HyperCard was slow in general and did not support color. Finally, The Gateway structure forced users to enter and back out of a number of screens, making it time-consuming to identify a variety of materials efficiently.

Also, the front-ending of databases and the online catalog was proving to be problematic. A full-time programmer was required to make the ongoing changes whenever a new database was added or an old one changed its search protocol. The cost for this unique programming was simply too high.

Gateway programmers created a prototype VT-100 version of The Gateway to address some of these limitations. It was accessible from any computer, provided increased speed, and accessed databases in their native format. However, this text-only version was difficult maintain and graphically uninteresting. The VT100 Gateway was scrapped with the realization that a completely new version was required to expand The Gateway’s capabilities and audience.

The Web Gateway

In 1994, The Gateway Functions/Narrative Advisory Team reviewed all the current Macintosh Gateway screens as well as user comments. They then re-wrote the entire narrative text, shortened the pathways, and provided better links between sections. But rather than program the changes
using HyperCard, it was decided to explore an entirely new technology for this version: Mosaic and the Web.

Mosaic and the World Wide Web at that time were just emerging as new technologies. Both seemed ideal for addressing the limitations of the Macintosh Gateway. Hypertext Markup Language (HTML) was inexpensive, fast, easy to program, supported color. The Mosaic software allowed an increased number of users to access an HTML Gateway system from any computer with a connection to the Internet and a Web browser.

At that time few people in the Libraries knew about HTML programming. Those few who did had no time to help re-tag the Macintosh screens onto an HTML document. Therefore, the User Education librarian undertook the task of learning HTML programming and migrating the revised screens into an HTML Gateway.

The first HTML Gateway did not take advantage of the unique functionality available, but consisted simply of the updated Macintosh Gateway screens re-programmed to be accessible on the Web. However, the program worked, it was fast, and could be read from any computer. This version demonstrated Mosaic and HTML could successful address many of the shortcomings present on the Macintosh version.

Unfortunately, front-ending of electronic resources was not possible with HTML programming. Telnet links from the HTML Gateway could still connect to the networked databases, but only in their native interface. Users, however, did not complain. The OhioLINK consortium required Ohio State to use their menu-driven catalog for member libraries, replacing the Libraries’ user-hostile catalog. In addition, OhioLINK made available numerous research databases with the same front end as the catalog, eliminating the need for The Gateway to provide custom programming to many electronic resources.

This HTML Gateway was tested and mounted on the Libraries server in Winter 1995. Immediately it had an impact on the Libraries Freshman Instruction Program. The HTML Gateway now allowed students to identify a variety of relevant resources for the assignment from computing labs, dorms, and home, then come into the Libraries only to view and evaluate the materials they selected.

Gone were the lines of students waiting for computers in the Undergraduate Library. Gone were the problems of slow screen displays and system overloads. Instead, users found a fast, graphical system with color screens and streamlined pathways to resources. Best of all, it was available from any personal computer with Internet connectivity and browser software, even when the Libraries were closed.

The New WWW Gateway

Still, this first HTML was not ideal. It still required users to access several screens to identify relevant materials of different resource types, possibly discouraging them from using a variety of resources. Also, as it relied heavily on HyperCard screen layouts, it did not take advantage of HTML functions such as graphical maps, scrolling screens, frames, forms, and internal links within a page.

Finally, there was no easy way to include Web sites in the existing structure. Can a Web site be categorized as an encyclopedia? A statistical source? Can it be placed in its own category or would this be counter to the goals of The Gateway?
As soon as the HTML version was created, the User Education Office began work on new version, a Gateway which would promote the search strategy, reduce the numbers of screens, and simplify access to a greater number of resources.

The Gateway Development Committee was formed, composed of representatives from the Libraries as well as the Ohio State teaching faculty, to oversee the development of a new Web version of The Gateway.

A consultant was hired to provide technical and design assistance. The Development Committee arranged for brainstorming sessions with Libraries personnel for ideas to make The WWW Gateway more useful to advanced as well as novice users. Subject specialists from the department libraries were involved in revising the titles for their areas. The WWW Gateway became a Libraries-wide effort.

The result is a new WWW Gateway which guides users to resources based on rather than resource type. Users can also access known resources from an alphabetical list of all titles found on The WWW Gateway.

Clicking on a subject from the Gateway list brings up a page with titles and abstracts for recommended print, electronic and Web resources. Titles are organized from broad background resources to highly specific support materials.

A graphical map of this search strategy illustrates this at the top of each subject page. To assist users decide which resource is needed, the map displays available resources in terms that describe the users’ information needs (e.g., “Background Information,” “Current Information,” “People,” “Quick Facts,” etc.). Users can either click on a section of the map to see specific materials or scroll through the entire and view all relevant titles and abstracts for that subject. [See Figure 2]

One screen now contains all core recommended materials, annotated and organized in a logical manner. Each title is linked to a resource card as on the Macintosh version to provide additional information on the title as well as the Telnet link to access any database.

Web sites which have been evaluated by subject specialists from the Libraries are intermingled with print and electronic resources to encourage serendipitous browsing. The sites are marked with the notation “(WWW)” following their titles, but otherwise are not different in their presentation on the resources page from titles of other formats. Because it takes little effort to scroll through the recommended titles, users can easily explore more than one resource and format type, then select the items best for their needs, confident in the quality of these resources.

For advanced users who need more specialized materials than The Gateway is designed to provide, a new section on the search strategy map is available for “Further Research.” This section contains titles for bibliographies on the topic, but also provides links to Web pages for the corresponding OSU department library and their list of extended resources and services. In this manner, The WWW Gateway can concentrate on core resources, yet offer specialized materials for more advanced research.

The WWW Gateway has undergone tests with users the last three months. It is scheduled to replace the current HTML Gateway Winter 1997 in time for the new incoming students and their library assignments. Due to licensing restrictions to online databases and security issues, The WWW Gateway will initially be available only on the Columbus campus to OSU-affiliated users.

Expansion plans
Development of The WWW Gateway is an ongoing process. Resources are updated quarterly by Libraries’ subject specialists. The Gateway Development Committee reviews user comments from the online evaluation form to determine new functions and design changes needed. As new technologies are refined, such features as search engines, on-the-fly records, and interactive help pages will be incorporated.

The WWW Gateway to Information promises to live up to its name and provide organized access to a wide variety of information for the Libraries and departments throughout The Ohio State University. The “Further Research” section will feature links not only to the department libraries home pages, but OSU academic department sites as well. Existing bibliographies created by other universities and already available on the Web will also be linked to this section. Whatever resources are evaluated by subject specialists as useful to Libraries’ users will find a place on the search strategy of The WWW Gateway.

To assist users understand how to select relevant resources, a new section on “Evaluate Your Materials” is being created and will be linked to all screens. Users will also find help from the HTML versions of current instructional brochures on interlibrary loan, circulation rules, OSCAR/OhioLINK, and electronic indexes.

A new interactive Internet tutorial is being designed by the User Education Office and will be linked to The WWW Gateway. This tutorial will help novice Web users understand the big picture of what the Internet is and further assist them identify, select, and evaluate relevant Web tools.

Conclusion

Users of a modern library require assistance to critically analyze their information needs and recognize which library resources provide relevant information for them. As budget constraints force library staff away from labor-intensive workshops and one-on-one instruction, the World Wide Web offers a platform for disseminating instruction as well access to recommended resources.

The WWW Gateway to Information helps users from any computer at any hour sort through the millions of available materials in print, electronic and Web format to identify resources recommended by subject specialists. The structure of The WWW Gateway is organized to be able to incorporate other information resources as they are identified by librarians. In this way, the Libraries and The WWW Gateway fulfill the role for which librarians are uniquely qualified: helping people become independent, successful information users.

(FIGURE 1 AND 2 NOT AVAILABLE IN ELECTRONIC VERSIONS)

