The world wide web and libraries: From search interface to bibliographic instruction

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Abstract

The World Wide Web is rapidly being adopted by libraries and database vendors as a front end for bibliographic databases, reflecting the fact that the Web browser is becoming a universal tool. When the Web is also used for bibliographic instruction about these Web-based resources, it is possible to build tutorials incorporating actual screens from a database. The result is a realistic, highly interactive simulation of database searching that can provide a very detailed level of instruction.

KEY WORDS: bibliographic instruction; tutorials; web interface; online catalogs; bibliographic databases

1. Introduction

There is no doubt in my mind that the most important computing innovation of this decade is the World Wide Web. I can remember learning about the World Wide Web in the early 1990s, and I was not very ¡ impressed by it. The only way to access it then was to log into a computer in Switzerland, so it was not very different than logging into a traditional computer system, to use an online catalog, for example. The new interface made it easy to move from one document to another using hyperlinks, but the fact is, all the documents looked pretty much alike. They were all displayed using the traditional grid of the dumb terminal inter-

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face: 24 lines on the screen with 80 characters per line. All the characters were the same color, white on a black background, or green on a black background, or some other simple combination of colors depending on the capabilities of the terminal or terminal emulation software. Because of the constraints imposed by the terminal interface I found it very easy to get lost among the documents on this early version of the Web.

All of this changed dramatically within a year or two after the introduction of a program called Mosaic. Mosaic was a radically different Web client, or browser, because it was designed to run on a desktop computer that communicated directly with the Web servers where the documents were stored. More importantly, the desktop computers were capable of displaying a wide range of colors, different fonts and font styles, and graphic images as well as text. This made it possible to construct documents for the World Wide Web that were more pleasing to the eye, more distinguishable from each other, and richer in content.

Just as important as the graphical browser, but less commonly acknowledged, was another innovation introduced by the creators of Mosaic. This was the Common Gateway Interface (CGI) specification, which defined a method of communication between Web servers and external programs. This technology made possible a much higher level of interactivity than simple hyperlinks.

Mosaic was the beginning of a revolution, and the browsers we use today are its direct descendants. Because of this revolution, the World Wide Web has become a popular medium for publishing and retrieving information of all kinds, for buying and selling, and for instruction. And consequently the Web browser has become a universal tool, used for doing almost any kind of work online.

2. Library web interfaces

Libraries were quick to see the advantages of the Web, first for helping their users learn about library resources, and soon after that to actually deliver library services. Today libraries are using Web interfaces for online catalogs, encyclopedias, journal indexes, article delivery systems, full text databases, full text databases, online reserve materials, and requests for interlibrary loans. Some examples from Kent State University (KSU) follow.
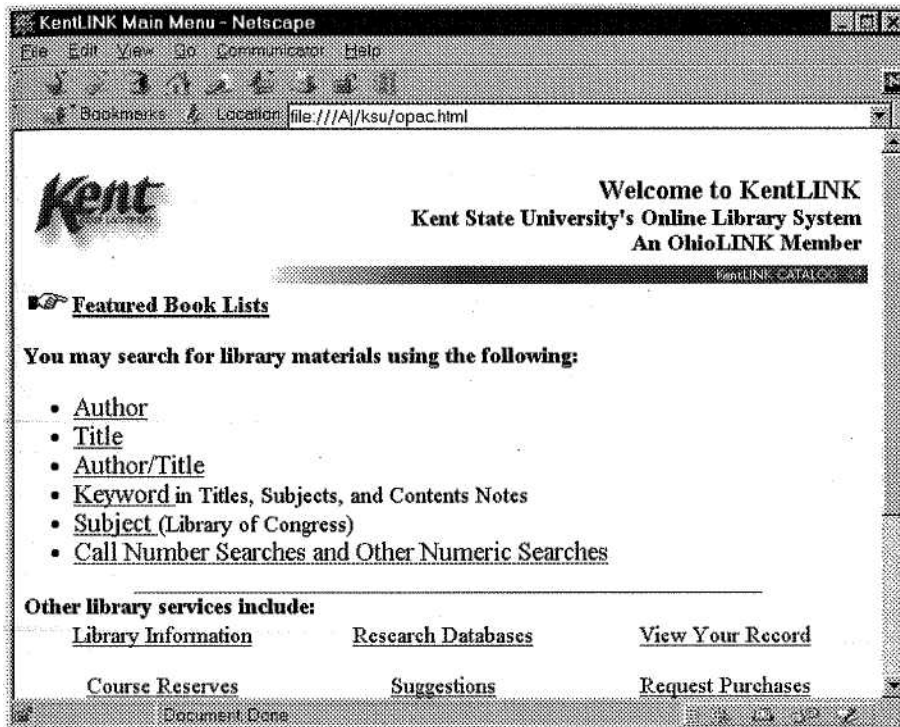
Figure 1. Kent State University Online Public Access Catalog

Perhaps most important is the Online Public Access Catalog (OPAC) (Figure 1), which includes links to a number of other direct, Web-based services, most of them embedded in the OP AC. "Research Databases" is an important category, primarily consisting of resources offered by the OhioLINK consortium of which KSU is a part. OhioLINK's commitment to move away from terminal-based to Web-based interfaces is unequivocal. A year ago OhioLINK offered fifty-four databases, and only seven of them had no HTML interface; most of the rest had both Web- and terminal-based interfaces. Today there are over sixty databases, and only a dozen of them have an option for a terminal-based interfaces.

This trend was solidified by the decision to develop a standard OhioLINK Web interface for all databases, licensing data from a variety of vendors and mounting it on OhioLINK computers using a single com-

mercial search engine. Until recently OhioLINK had been using two different methods for providing database access: licensing data and mounting it on the Innovative Interfaces platform and licensing access to vendor-maintained servers.

Among the other Web services offered by the Libraries is a commercial product called ERes, an online reserves system (Figure 2).
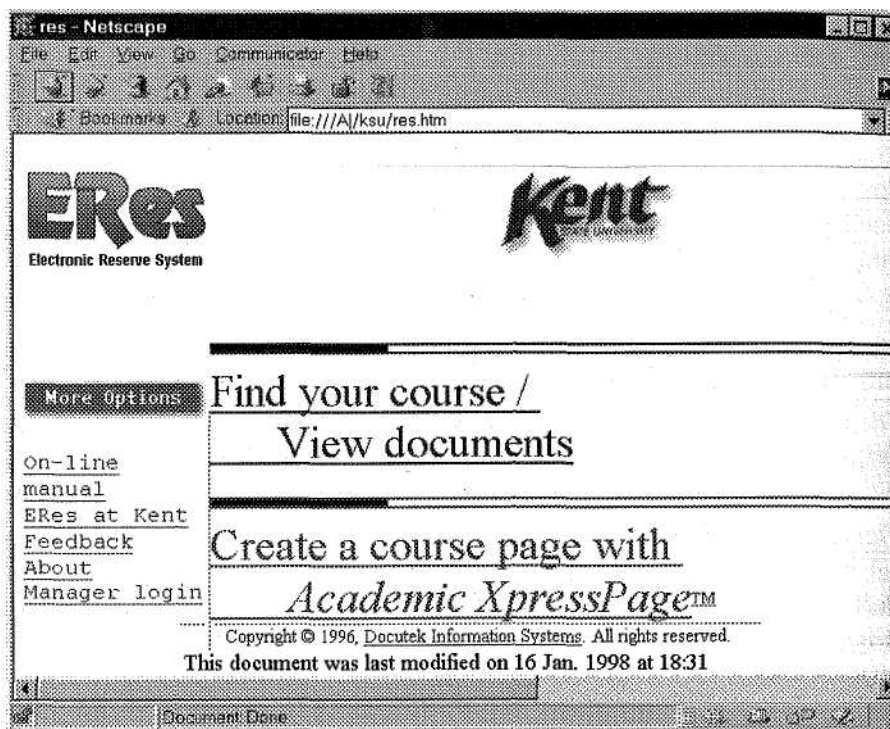
Figure 2. Electronic Reserves system at Kent State University.

Library staff use ERes to create a virtual reserves desk consisting of digitized images of articles and excerpts from books, collections of hyperlinks related to course topics, and other material that professors maj submit, such as lecture notes and sample exams. The material is organized by course and professor, and is pass worded to limit access to students enrolled in a specific class.

Other Web-based services have been developed within the library. The first is a form for submitting interlibrary loan requests. This is a simple

CGI application that consists of two forms, the first requesting the borrower's personal data (Figure 3). The second form is for bibliographic data for the requested item, which is displayed after the requestor acknowledges a copyright statement. In this case the CGI program accepts the form data, reformats it into an email message, and sends it to the Interlibrary Loan department.

A second example of a library-developed CGI application, this one considerably more complicated, is a full text archive of the university's student newspaper (Figure 4).

*Figure 3.* Interlibrary Loan Request Form.

It is taken for granted today that the online resources illustrated here are hosted on three different types of computers-and it makes absolutely no difference to the people using them. Ten years ago this kind of interoperability was only a dream. Now decisions about what hardware platform to use for hosting a database are made on the basis of technical convenience and efficiency. There is no need to take into account the kind of hardware the end user has, as long as it is capable of running a browser program and is connected to the Internet.

The transition from the terminal interface to the Web interface is happening very quickly. Two or three years ago commercial online vendors were providing Web interfaces as an extra feature. Now it is taken for granted, and by the year 2000 I expect the dumb terminal interface to be nearly obsolete.

3. Bibliographic instruction

I think most people will agree that the World Wide Web has made it easier to use computers and to access information on the Internet. But the fact remains that databases such as online catalogs are sophisticated-tools. They may be simple to use for basic functions, but they can be difficult to master. Likewise libraries themselves can be difficult to use; there are many kinds of services and resources, and it's not always easy for the library patron to know how to start looking for something. So even with the World Wide Web some form of bibliographic instruction is needed.

As mentioned before, the Web has become a popular medium for teaching, and many professors have created Web pages for the courses they teach. The pages may include a syllabus, a list of assignments and readings, lecture notes, quizzes, and links to Web sites related to the subject of the course. In a few universities professors are even required to have a Web page for each course. In other universities some courses are taught entirely over the Web, with online discussion replacing direct classroom interaction.
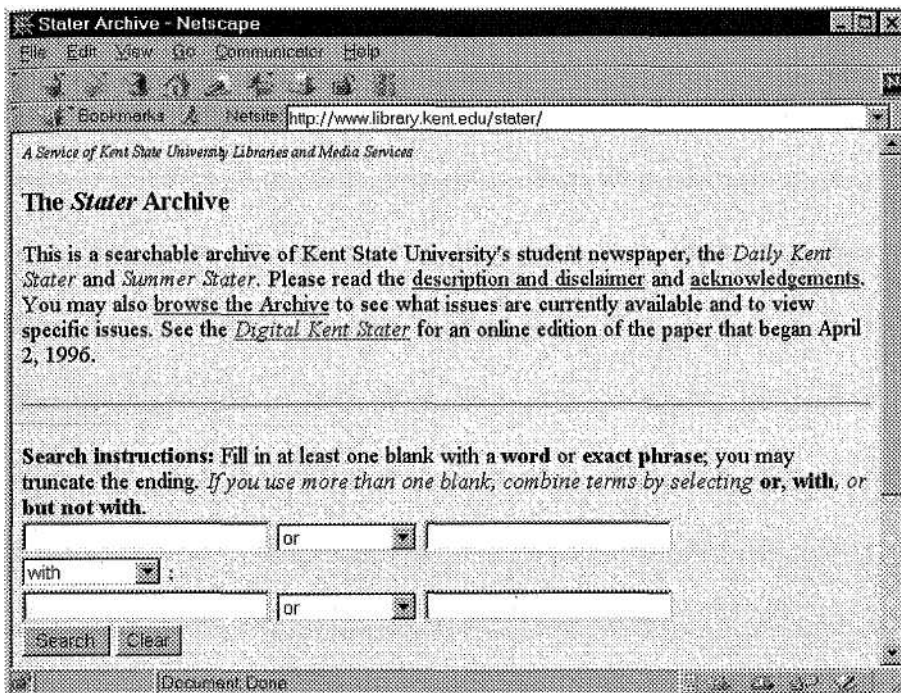
Figure 4. *Full-Text Archive Based on CGI and a Commercial Search Engine*

But more commonly the Web is used for short, self-contained tutorials on a specific topic. Most of these are on technical, computer-related topics-for example, how to write a Web page, or how to install a network-but there are examples of libraries developing such tutorials for bibliographic instruction. A number of these will be cited here with comments on their interactivity.

The first example is PLUTO, the *Purdue Libraries Universal Tutorial Online',* which is a fairly comprehensive tutorial on using THOR, Purdue University's online catalog, and finding materials in the library. The tutorial is primarily text based, but includes some graphic screen shots of THOR's terminal-based interface. A similar example is the *Library Explorer on the Web*[2] at the University of Iowa. The Library Explorer is

'http://www.lib. purdue.edu/tutorials/pluto/index. html
http://www.lib.uiowa.edu/libexp/

a thorough bibliographic instruction tutorial, again mostly text-based, but the portion relating to the online catalog is illustrated at each step in the searching process with screen shots from the catalog (Figure 5). In both cases the interactivity of the tutorials is primarily provided by navigational controls, augmented by hyperlinks to definitions of terms or related topics.
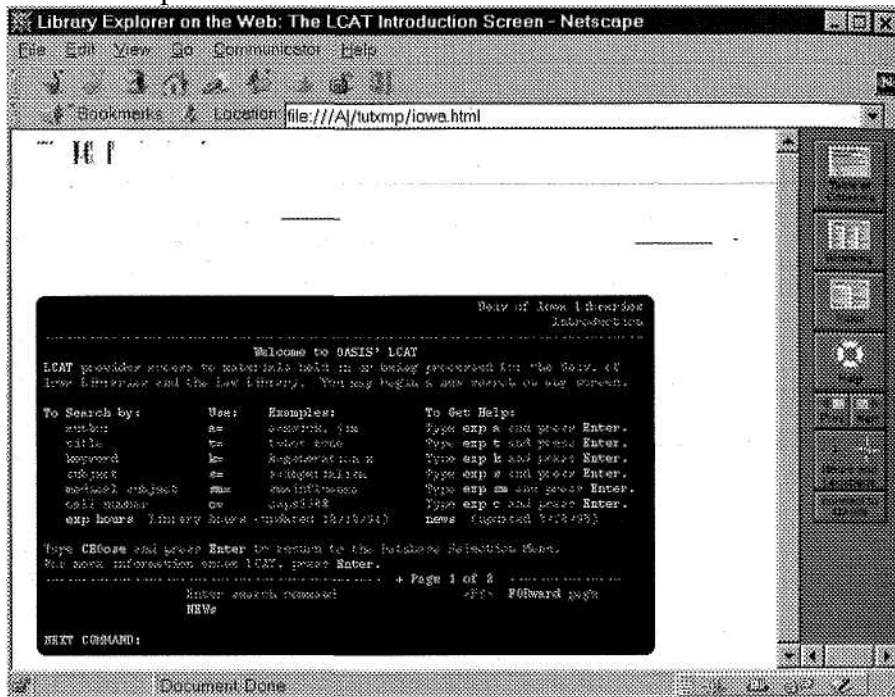
Figure 5. *The Library Explorer on the Web, University of Iowa*

Some other tutorials are teach the use of Web-based resources. The library at the University of California, Berkely provides its patrons a lot of guidance in searching the Internet[3]. In addition to providing discipline-specific guides to searching the Internet, there is an extensive tutorial on searching the Web. It includes a section that explains meta-search engines (search tools that pass a search to multiple search engines such as Altavista, Infoseek, Excite, etc.) and even provides a built-in form for submitting such searches. There are also sections on individual search

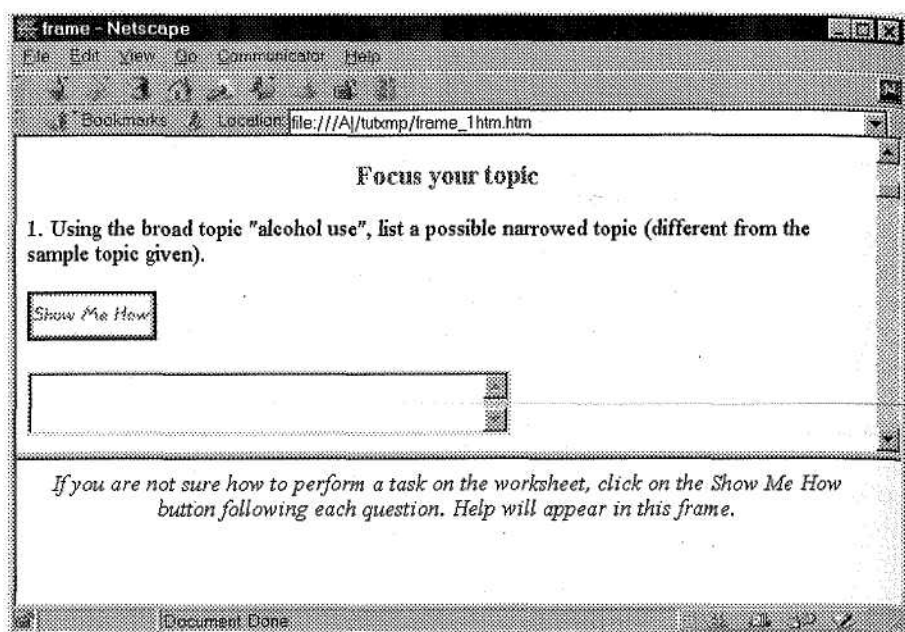'http://www.lib.berkeley.edu/TeacliingLib/Guides/Internet/FindInfo.html

engines which make use of screen shots for illustration and incorporate abundant hyperlinks, but they are primarily textual.

The library at Oklahoma State University provides a number Web-based guides and tutorials. One tutorial covers ProQuest Direct[4], and is similar to the Berkeley tutorial in appearance, though it is much narrower in scope. It has an additional element of interactivity that is an alternative to direct navigation. Instructional text accompanied by a screen shot is followed by a series of optional multiple-choice questions on the material. Correct answers permit students to proceed with the tutorial while incorrect answers provide feedback that is hyperlinked to the text that explains the concept behind the question.

The library at the University of Northern Colorado takes a somewhat different approach in its *Library Tutor*[5] (Figure 6). Its aim is to teach the concepts behind researching and writing a paper rather than specific library tools. The Library Tutor is an online worksheet that guides a student through the process of narrowing a sample topic, selecting research tools, identifying sources, finding materials in the library, and evaluating sources. For each step in the process it provides a brief description, optional details, and field to record the students decisions and findings. At the end of the page there is a button to submit the students' work to a librarian.

[4]http://www.libra ry.okstate.edu/guides/piOquest/index.litm
[5]http://www.univnorthco.edu/library/libtutor/libtutor.htm

Figure 6. The Library Tutor at Northern Colorado University.

4. KSU tutorial

About a year and a half ago some of us at Kent State began discussing the possibility of developing a Web-based tutorial for bibliographic instruction. The clearest need was for an introduction to the basic library tools-the catalog and periodical indexes. For many years the KSU Libraries have had some kind of bibliographic instruction program to introduce these tools to first-year students. At one time the instruction consisted of a lecture delivered by a reference librarian during one session of the first-semester English course, which included an assignment to write a research paper using sources found in the library.

With a number of budget cuts over the years, the number of librarians available for these lectures became so small that it was no longer practical to provide this level of instruction. Besides, there was a growing reluctance on the part of the English faculty to give up a class session for bibliographic instruction. Consequently, when the university introduced a mandatory orientation class for all first-year students, the bibliographic instruction program was incorporated into it. This class is taught by two

people, one of them a member of the faculty in the student's department, and the other a student, usually in the third or fourth year. The course covers many different topics, including time management, study habits, services and activities available on campus, and selecting a career.

Until this year the bibliographic instruction remained in a lecture format, delivered by one of the two instructors. The lecture material and a written assignment, however, were prepared by a librarian. The purpose of the lecture was to teach the students how to search a topic in the online catalog, identify a book on the topic, and find it in the library; and to repeat the process for an article in the Periodical Abstracts database.

One of the reference librarians and I have developed a Web-based tutorial to replace the lecture. The goal of the Web tutorial is to improve the consistency and the quality of the bibliographic instruction. The fact that the lectures were prepared by one person and delivered by another was a bit of a problem. Sometimes the lecture was well done; at other time it was less effective. For example, the instructor may not have understood the material very well or may not have been very interested in it. This was especially true if the faculty instructor decided to let the student instructor deliver the lecture.
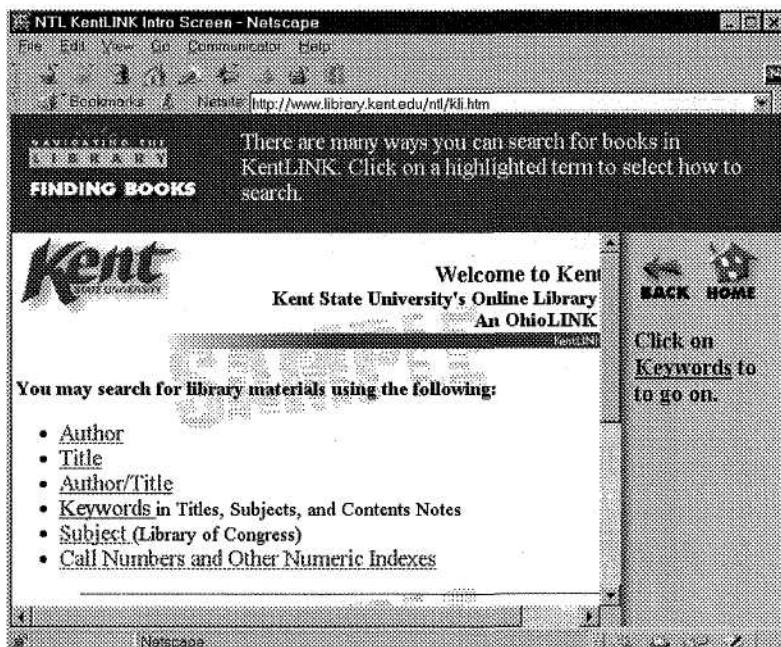
Figure 7. Navigating the Library.

The online tutorial, called Navigating the Library6, is designed to be as interactive as possible. Rather than relying on extensive explanatory text, it creates a controlled environment that reproduces the look and feel of the databases (Figure 7) while guiding the students' actions and intercepting any mistakes. When the student understands the point being made and performs the desired action, the tutorial proceeds to the next step; if the student makes mistake, the tutorial provides corrective feedback instead of permitting the student to wander off on a tangent (Figure 8). Since the tutorial uses essentially the same HTML that is used in the actual database, the screens that the students see and interact with are identical in appearance with those in the database. The functionality of the screens, though, has been modified to serve"the"instructional purposes of the tutorial, and only simulates the operation of the database engines. This level of realism is only possible because the catalog, the database, and the tutorial all share the same medium-HTML, the language of the World Wide Web.
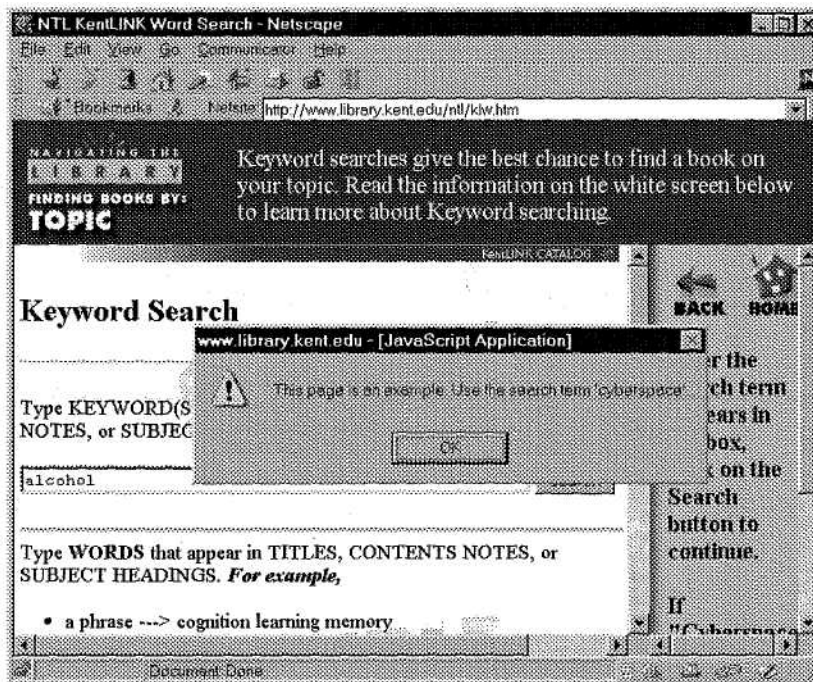

Figure 8. Corrective feedback in Navigating the Library.

"http://www.library.kent.edu/ntl/

This technique requires modification of every hyperlink and button on the screens taken from the online databases. The intended or "correct" actions lead to the next screen of the tutorial, while all others produce a message indicating the nature of the student's mistake. Some times it is only necessary to change a hyperlink, but in order to produce pop-up dialog boxes a scripting language is necessary. The action of form buttons can be modified using CGI techniques, but scripting is much simpler and just as effective. Using a scripting language within the Web pages also means that the tutorial can be implemented on any Web server since CGI programs frequently require some degree of modification when moved from one platform to another.

5. Conclusions

Last year a prototype of *Navigating the Library* was introduced to about 15 groups of students during the fall semester, and a slightly modified design was tested with a similar number of students during the spring semester. This fall the tutorial is being fully deployed in all sections of the orientation class, reaching all of KSU's nearly 3000 first year students.

Navigating the Library has received generally favorable comments from both students and instructors. I believe the Web tutorial achieves its goals of improving bibliographic instruction in several ways. First of all, the tutorial is interactive-instead of simply listening to a lecture or reading instruction, the student is required to take action. This reduces the boredom and confusion that was evident with the lecture format. Because students work independently at their own pace, their time is much better spent-some can complete the tutorial in 15 or 20 minutes while others need 30 or 40. The instructors make better use of their time as well. Instead of using the entire class period delivering a lecture that is targeted at the "average" student, they answer individual questions and help the students who need it the most.

Some possible enhancements for Navigating the Library include adding a virtual tour of the library, and incorporating the assignment into the tutorial so that it is completed online instead of on paper.