

How Students Use Web-Based Tutorials and Library Assignments: Case Studies from The Ohio State University Libraries

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Abstract

Use of the World Wide Web to teach information retrieval skills to college students is a rather new phenomenon. Understanding how students react to and interact with this new media is essential for building successful instructional programs. This paper presents and analyzes data from several studies of user behavior and perceptions of Web-based instruction at The Ohio State University Libraries.

The *net.TUTOR* program of self-paced Web tutorials on using the Internet for research was introduced in Fall 1997. Ten interactive lessons focus on basic skills (Web browsing, e-mail), tools (mailing lists, newsgroups, browser plug-ins and customization), searching (cross-resource skills as well as Web search tools), and research skills (evaluation of sources, research strategies, citing sources). Several large enrollment classes at The Ohio State University as well as a number of smaller classes have incorporated the *net.TUTOR* program into their syllabi. Numbers of independent *net.TUTOR* users not connected with courses continues to grow on campus, nationally and internationally. User log data collected by the course management software provides a unique and detailed picture of how students interact with lesson components. Additional data collected from user surveys offer insights into student perceptions of this new instructional program.

Additionally, the existing library instruction program for new students at Ohio State, which enrolls approximately 10,000 students each year, has migrated to Web-based library assignments and now teaches skills that are essential to success using today's online information resources. Hands-on lessons focus on the evaluation of Web resources and on practicing search skills needed to efficiently use online encyclopedias such as *Britannica Online*, full text periodical indexes, or the Libraries' catalog. *net.TUTOR* lessons are offered as supporting resources for those students requiring additional instruction in searching and evaluation techniques. Data collected from surveys of students completing these new library assignments sheds light on comfort levels and perceptions of success as well as the impact on library personnel and resources.

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Introduction

For the past 20 years, the User Education program at The Ohio State University Libraries has reached over 23,000 users annually with some form of bibliographic instruction (BI). Most of this instruction employed traditional methods of general workshops, in-class presentations, and tours.

In the past few years, however, with the availability of networked and Web resources, there has been an increased need to help users sort through the information readily available from any computer connected to the Internet. The OSU Libraries' Web page alone offers access to over 170 networked databases, as well as online catalogs and e-journals.

Even selecting an online resource had grown to be an arduous task. Conducting a search, evaluating results, and then printing, downloading, or otherwise manipulating the data were skills most users did not possess.

Established methods of BI proved impractical to address these needs. Decreasing attendance figures showed that users no longer desired "specific time/specific place workshops" to learn skills, even if the Libraries could recruit enough staff to teach these additional classes. Printed instructional guides could be expanded, but were useless to the many users who connected to the Libraries from remote computers.

By 1997, the User Education Office was convinced that to expand instruction to a larger audience, online instruction must be developed. Networked instruction would not require staff to teach new classes, could be accessed remotely at any time, and could help large numbers of users learn a wide variety of research skills.

Since then, two major online instructional projects were developed, tested, and implemented in the OSU Libraries. The first, *net.TUTOR*, provides interactive, Web-based tutorials for learning to use the Internet for research. The second project delivers a Web-based library assignment to 10,000 freshmen yearly.

Web-Based Tutorials

Web-based learning is increasingly popular with college students. They like the convenience and flexibility in scheduling their time, but poor Internet skills inhibit their ability to fully participate in these course offerings. Administrators and faculty at The Ohio State University wanted a program that could be used across the curriculum to insure development of baseline skills and provide a platform to build distance education courses upon.

The Ohio State University Libraries received an Academic Enrichment Grant from the University in summer 1996 to develop a program to enhance the Internet skills of students. *net.TUTOR* <<http://gateway.lib.ohio-state.edu/tutor>>, first deployed in Fall quarter 1997, provides instruction on various aspects of using the Internet for research.

The program consists of self-paced tutorials on using Web browsers, electronic mail, mailing lists and newsgroups, searching concepts and techniques, Web search tools and strategies, general research strategies, evaluation of Web sites, intellectual property issues and methods for citing Internet sources. Content was determined through a needs assessment of library staff and input from an advisory panel of university faculty, computing center and library staff.

Each tutorial includes a "classroom" portion, where content is presented succinctly. Practice opportunities are provided throughout, but are not mandatory. Classroom lessons are followed by optional multiple-choice quizzes. Additional content includes a list of links to sites that offer further information and in many cases a "Quick Guide" which presents lesson information in a concise fashion, optimized for printing.

net.TUTOR utilizes Docent (formerly IBTauthor) course management software and runs on a Windows NT server. The Docent software handles user registration and authorization, serves content pages, manages quizzing, records quiz and other user history data, and provides reports on usage.

The *net.TUTOR* program began with the "interactive" version running under Docent software, but it expanded in Winter 1998 to include a second "basic" version, available to users without prior registration. This basic version mirrors the lesson content exactly, but does not include interactive quizzes or track usage.

Usage Data

From Fall 1997 through Fall 1998, 4,301 individuals registered to use the "interactive" version of *net.TUTOR*. Of these, 72% were undergraduates, 11% were graduate students and 17% were faculty or other types of users. Overall, 86% of registered users were affiliated with The Ohio State University and 94% listed their place of residence within the U.S.

A growing number of Ohio State faculty now use *net.TUTOR* in their courses. Twenty-six courses, ranging from the large enrollment freshmen survey course, UVC

100, to graduate level courses in education, law, music and business, have incorporated *net.TUTOR* assignments into their syllabi. Eighty-six percent of registered users are students completing a course requirement.

More than 8,800 individual lessons have been completed by users of the interactive version of *net.TUTOR*. The most popular lessons are those related to using Internet tools (Web browser and e-mail), with the lesson on evaluation of Web sites ranking third. Lesson choice, to some extent, is determined by the nature of the course assignment. The evaluation lesson, quite popular with faculty, is frequently required.

The survey forms appended to each lesson provide other data. From Fall 1997 through Fall 1998, 6,651 surveys were returned. Twenty-eight percent of these respondents indicated that they were new to the Internet, 59% had moderate prior experience and 13% reported extensive experience.

A question about user location was added to the survey forms in Spring 1998. In 3,335 surveys submitted from Spring 1998 through Fall 1998, 46% of respondents were working from home or dorm room, 35% were in a campus computer lab, 12% used a computer in the library and 7% were in other locations, such as an office.

User Attitudes

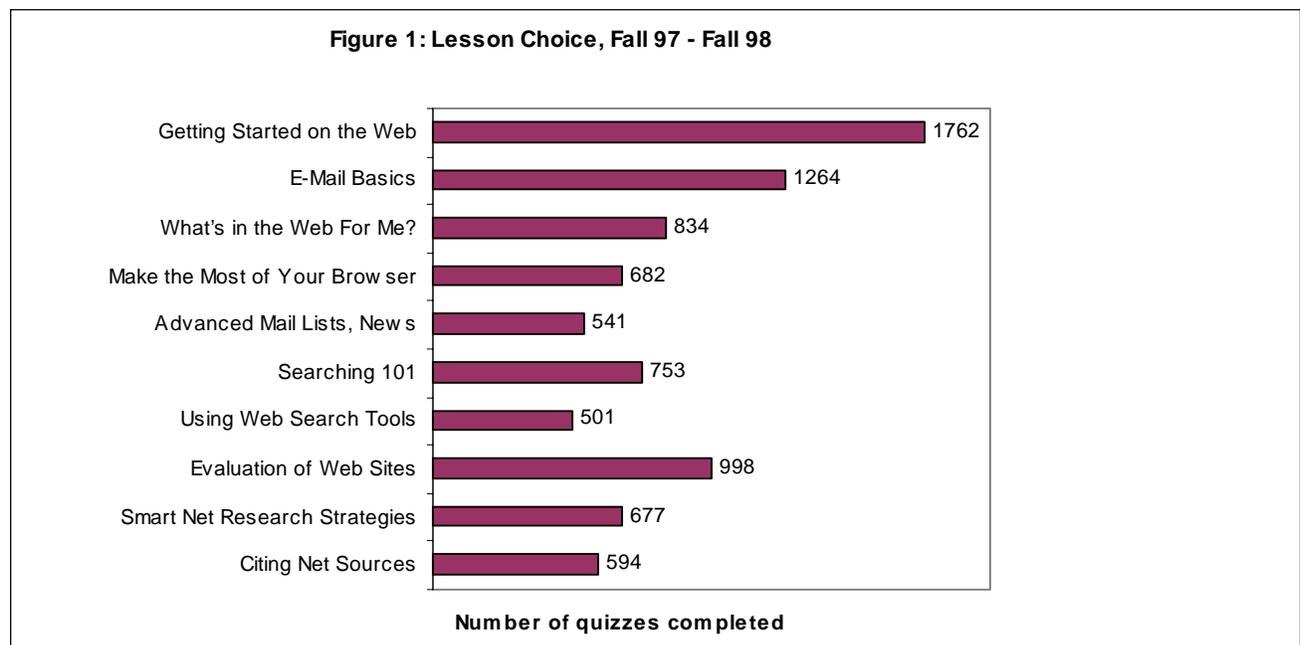
Responses to survey forms also provide a view of user satisfaction and help to identify problems and lessons

requiring revisions. Overall satisfaction (for all lessons combined) was high. On a Likert rating scale of 1 (lowest) to 5 (highest) satisfaction, 50% of respondents chose 4 or 5. 31% of these users chose 3, while 19% disliked the lessons, choosing a 1 or 2 rating. Some of this dissatisfaction may be attributed to software failures during periods of intense demand. These are being addressed by implementation of new hardware and more robust web server and database software to manage these peak loads.

Considering mean satisfaction ratings for specific lessons, respondents were most satisfied with the lesson introducing the Web browser (3.6) and least satisfied with lessons on searching (3.3) and evaluation (3.2). The searching lessons have also consistently received a higher difficulty rating, despite several revisions to the content. User quiz scores for these lessons are also lower.

Those who classify themselves as new to the Internet have the highest overall mean satisfaction level (3.6), but there are no significant variations by user experience level. Those with extensive experience (often faculty evaluating the program for use in their course) have an overall satisfaction rating of 3.5, while those with moderate experience, the great bulk of the user population, have an overall rating of 3.4.

User motivation reveals more interesting differences. Those users who are required to complete lessons have consistently been less satisfied. Using Fall 1998 as a rep-



representative quarter, the mean satisfaction level of those completing a course requirement was 3.2, while the mean rating of those choosing the program independently was 4.0. To some extent, this may reflect residual resentment toward inappropriate assignments by their instructors. Attempts to educate instructors about how to use the program have helped, but some faculty still require students to complete all lessons rather than letting them choose those matching their needs.

User Behavior

Four studies of user's history log files were completed. A total of 465 detailed user histories were examined. Time spent and tutorial components used were tracked for each lesson viewed by the user. Two studies utilized random samples of all registered users during Fall 1997 and Winter 1998. Two other studies focused exclusively on Communication 140 students during Winter and Spring quarters in 1998. Each data group represents between nine and twenty percent of all registered users during that quarter and offers a somewhat different slice of user activity.

As Figure 2 shows, those viewing all parts of a tutorial ranged from 10-14% in these studies. During Fall 1997 and Winter 1998, more than one-third viewed both lesson and quiz components and approximately the same number skipped directly to the quiz.

In an attempt to encourage more users to view the instructional portion of the tutorials before taking quizzes, changes were made to quiz grading protocols in Spring 1998. Prior to that time, users were allowed unlimited attempts to answer quiz questions correctly and once a correct answer was selected, received full points for it. Now users are limited to one attempt at each multiple choice quiz question and points are deducted for incorrect answers selected prior to choosing the correct one. As the Spring 1998 study data indicate, this tactic was successful. Those skipping the lesson content dropped to 25%, while almost 50% viewed lessons before taking quizzes.

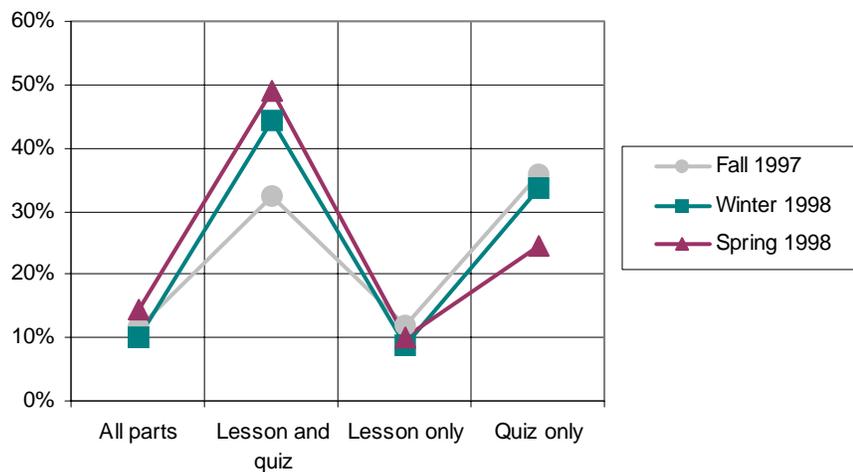
Course-affiliated users spent on average twelve minutes per tutorial. Those in upper division or graduate courses (300+) spent about two to three minutes longer on searching and research skills related tutorials than students in lower level courses. General users spent almost twice as much time (twenty-three minutes) viewing content in the tutorials. Some of this difference may be attributed to users connecting via modem versus those using campus computer labs or other speedier Internet connections. General users may also be somewhat more likely to try suggested activities in the tutorials, thus lengthening time spent viewing pages.

The Online Library Assignment

The Ohio State University Libraries have enjoyed a 20-year instructional relationship with OSU's University College. All 10,000 incoming freshmen and transfer sophomores receive a Libraries' orientation session and two research assignments as part of their one-credit University College general survey class (UVC100). Scores from these assignments comprise 25% of the student's final grade.

When the OSU Undergraduate Library closed in 1997, however, UVC students lost their primary facility for completing their assignments. While students could use any OSU library for their project, the Undergraduate Library's general collection and friendly staff were geared to novice researchers. Other OSU libraries lacked

Figure 2: Comparison of Tutorial Activity by Part



the staff and collection resources to absorb additional UVC users.

Designing and Implementing the Online Library Assignment

In Winter 1998, based on discussions with public services librarians and demographic information about UVC students, a team of three librarians redesigned the second library assignment to be completely Web-based. University College studies showed that 80% of all incoming OSU freshmen brought a computer to campus. Coupled with the recent wiring of all OSU dorms for direct Internet access, the team felt many students would be able to complete an online assignment from their dorm room.

Rather than emphasizing print resources housed in a specific buildings, the new assignment now focused on networked materials available remotely without reliance on library facilities or staff. This addressed OSU librarians' concerns about the old UVC assignment regarding damaged print materials and overcrowded facilities. The online assignment would tap into students' enthusiasm for computers and Web searching, teach them needed skills, and help create an image of the Libraries as managers of high-tech information resources, not just buildings with books.

The new assignment was pilot-tested on 300 UVC students during Spring and summer quarters in 1998. Librarians gave in-class presentations to each UVC class and distributed instruction sheets with information on how to access the assignment Web site <<http://www.lib.ohio-state.edu/uvc/assignment.html>>.

From this site, students selected one online resources for exploration (*Britannica Online*, *Social Issues Researcher*, *Britannica eBLAST* or *OSCAR*, the OSU online catalog) and connected to a corresponding worksheet. This HTML worksheet provided the assignment instructions and embedded links to online databases and other "helper" resources. Students had to print a copy of this worksheet to complete and turn in, or they could pick up a paper copy in several libraries.

In three assignments, students followed step-by-step instructions through keyword searches on their topic using Boolean operators, noting variations in number of hits for each search. They recorded related subject headings and sub-topics, then selected a relevant article or book and created an citation. In the fourth assign-

ment option, students identified relevant Web sites from *Britannica's eBLAST*, evaluated the quality of information and created a citation.

The assignment was distributed during Fall quarter 1998 to all 7,000 UVC students. Students had one week to complete the assignment, which then were graded by University College. Attached evaluation forms were returned to the Office of Library User Education for analysis.

Data from Evaluations

Data from a sample of 303 student comment forms during Fall quarter showed that this online assignment provided a quality learning experience for students and addressed many concerns of the Libraries.

Students rated their Web experience prior to this assignment as "Highly Skilled" (16%), "Somewhat Skilled" (65%), and "No Web Experience" (16%). Yet 86% indicated the assignment was "Very Easy" or "Somewhat Easy," including 67% of those with no previous Web experience.

Overall, students indicated they felt "Very Confident" (39%) and "Somewhat Confident" (51%) using the online resources. In connecting to the Libraries Web site, 51% overall felt "Very Confident, and 39% were "Somewhat Confident." Even 75% of those with no Web experience indicated confidence in these areas.

Comments on the evaluation forms indicated students were genuinely grateful for this hands-on experience with Libraries' resources. While some felt the assignment was "too easy," the vast majority indicated an appreciation of the research concepts presented.

Problems Anticipated

The design team anticipated there might be problems with printing the assignment, increases in support needed from staff, and technology breakdowns. The data, however, showed these were not major problems.

Only 20% of the students needed staff help to complete the assignment. Seventy-nine percent of students did not even come into the Libraries, opting to complete their UVC assignment in computer labs or from their home or dorm. Seventy-five percent of those with no Web experience completed the assignment remotely.

Although some students mentioned problems in printing the Web worksheet, their comments indicated most eventually either figured it out or opted to pick up a worksheet in the libraries. A poll of library staff noted that the 15% who choose to pick up worksheets were

able to get their assignments from folders at the reference desks without staff assistance.

Happily, there were almost no technology glitches noted. Although OSCAR was down for about five hours one day, no other network-wide problems were noted. Assignments were distributed throughout the quarter to prevent overload of the resources, with about 1,500 students receiving the assignment each week.

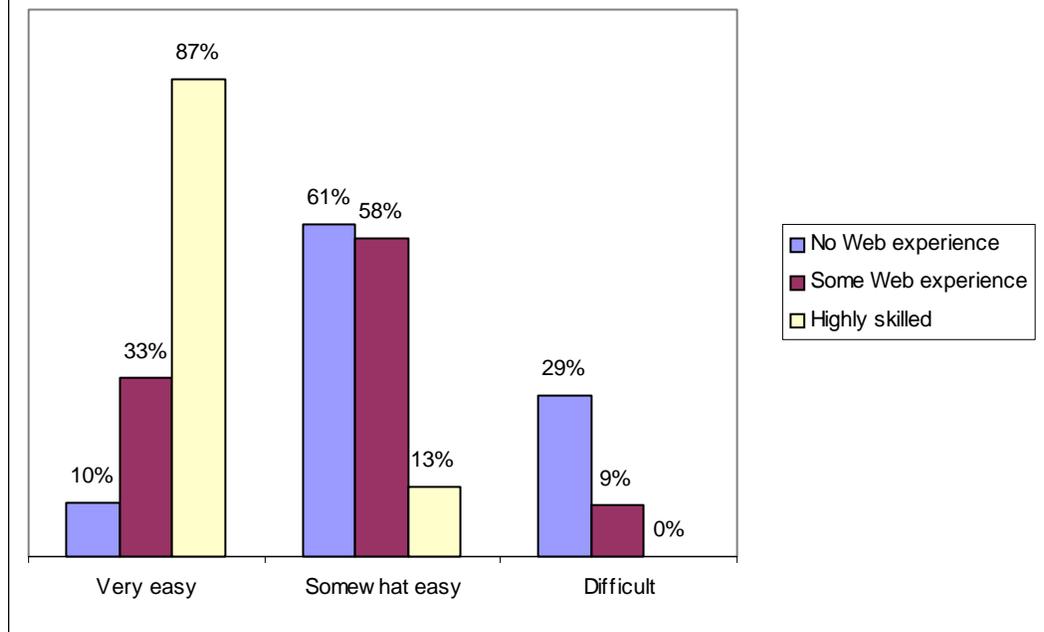
Prospects for Web-Based Instruction at Ohio State University Libraries

Based on evaluations from users, both the online library assignment and the tutorial program are successful. Both will undergo some changes over the next year. New online resources will be evaluated for inclusion in the library assignment. Designers will continue to monitor whether the major instructional emphasis for the assignment is appropriate. New *net.TUTOR* tutorials will be developed.

Other *net.TUTOR* enhancements are planned. In order to optimize access to tutorial content while minimizing duplication of effort and user confusion about which version to use, only one version of the lessons will be available. This version will not require prior registration. "Quick quizzes" will be available within lessons for user self-assessment purposes. Courseware will continue to be used to manage scored tests and other assignments for OSU students in a secure environment.

The library assignment design team will also consider feasibility of a worksheet that could be submitted and graded online. Making the answers multiple choice rather than open-ended would facilitate electronic grading, a tempting thought when faced with 7,000 assignments to mark.

Figure 3: Ease of Online Library Assignment



Both the online assignment and the interactive tutorial program are extensible models for library instruction in a large university environment. Each will be modified and expanded as the Libraries' technology and student baseline skills change. The biggest challenge in implementing these programs has been uncertainty over whether the campus network could handle the extreme load during Fall quarter. Close collaboration with computing center staff to find new ways to address infrastructure issues will be important to the future development of both programs.

Related Web Sites:

net.TUTOR

<<http://gateway.lib.ohio-state.edu/tutor>>

net.TUTOR Annual Report

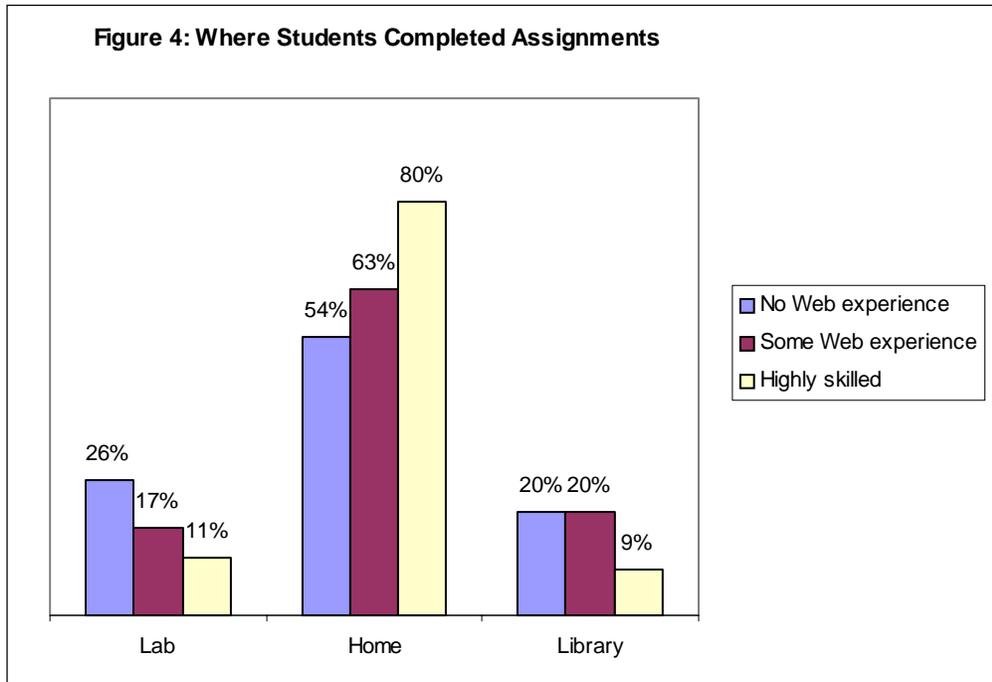
<<http://gateway.lib.ohio-state.edu/tutor/about.html>>

net.TUTOR Survey Form

<<http://gateway.lib.ohio-state.edu/tutor/open/les2/survey.html>>

net.TUTOR Survey Data

<<http://gateway.lib.ohio-state.edu/tutor/stats>>



UVC 100 Assignment Instructions and Survey
<<http://www.lib.ohio-state.edu/guides/uvcinstruct.pdf>>

UVC 100 Second Library Assignment
<<http://www.lib.ohio-state.edu/uvc/assignment.html>>