

Undergraduate Web-based Bibliographic Instruction

An Investigation of the Effects of Supplemental Discussion and Online Exercises on Student  
Performance and Learner Satisfaction

Randall M. MacDonald

University of South Florida

EME 7939

Spring 1999

## Undergraduate Web-based Bibliographic Instruction

## An Investigation of the Effects of Supplemental Discussion and Online Exercises on Student Performance and Learner Satisfaction

## Introduction

*This study will investigate the effects of librarian-led supplemental discussion and online exercises on student performance following exposure to a Web-based bibliographic instruction program. A comparison will be made between the performance of students who complete the Web-based instructional program and are exposed to the supplemental discussion, and students who complete the Web-based instructional program and a supplemental online exercise, to determine whether supplemental discussion or online exercises improve student performance to a statistically-significant degree on a post-treatment survey. Comparisons will be made between novice, intermediate, and advanced computer users, and learner satisfaction with the two instructional methods will be compared.*

Instruction in the effective use of library resources is critical for learners at any level and in any educational setting. Undergraduate students must rapidly assimilate new methods of library research as they progress through school, and much of this takes place through library-sponsored bibliographic instruction programs. Today's libraries incorporate a tremendous range of materials in diverse formats; no longer is the undergraduate library simply a warehouse of books and microfilm. The evolving library provides access to information in books and magazines; on audio and videocassette; through closed-circuit satellite broadcasts over the campus network; CD-ROM; and the Internet. The card catalog has given way to the

“online” catalog, with the possibility of Web-based access to library catalogs on a local and international level.

Beyond using the Internet to perform routine professional duties, bibliographic instruction librarians have created Internet-based lessons that are entire units of instruction tailored to local needs. These lessons constitute an evolving form of Computer-Assisted Instruction (CAI)—Internet-Based Training (IBT) and Web-Based Training (WBT)—wherein structured student immersion in the learning process is not bound by resources on a single computer, but organized with the Internet as a dynamic background source of information. These manifestations of technology in the library require training on three levels, all designed to help students develop as independent learners, which is a primary goal of many undergraduate library programs:

- Students must first learn the layout of the library—where to locate specific resources used in the information gathering process. These include the online catalog, CD-ROM or Internet workstations, and the Circulation Desk. The arrangement of materials in the library must be learned and internalized in order to improve the students’ efficient use of time.
- Second, students must learn to use library technologies. Instruction must insure that students develop basic search skills, and develop familiarity with software packages common in the library.
- Third, students must learn to critically evaluate the information they locate, from resources in local library collections to Internet and other remote resources. This will move students closer to making effective use of information in research or for specific projects, and will help students develop lifelong library skills.

The setting for any study affects the nature of the research questions. The setting for this study is Florida Southern College, a one hundred fourteen-year-old private college with a strong liberal arts emphasis. The library at Florida Southern College has offered various bibliographic instruction sessions and courses over the past forty years, but with minimal faculty involvement and only cursory comparison between different instructional approaches. This study will provide a basis for the library's renewed development of a bibliographic instruction program, and will help shape library services at the college.

### Proposed Instructional Model

The researcher proposes design and development of a Web-based Bibliographic Instruction Program to present interactive instruction for undergraduate students addressing the three levels of technology training identified above. The instructional program will be developed to run either on the World Wide Web or through a campus network. A prototype is on the Web: <http://snoopy.tbtc.lib.fl.us/fsc/bi/index.html> . Members of the target audience are expected to have had experience with personal computers and the Internet and should be comfortable using this medium with assistance from the researcher to learn about library resources, programs, and services.

The program will combine tutorial and drill elements at the knowledge, comprehension, and application levels of Bloom's Taxonomy, and will incorporate Javascript-enhanced feedback. Several survey instruments, a student worksheet, and an instructional outline for the librarian's use and will be included with the program.

### Why the Web?

Access to the Internet and World Wide Web has increased many-fold over the past several years, and students hear about the Web daily. The Web offers several distinct advantages over alternative bibliographic instruction delivery methods:

- Platform independence. Web browsers are available for Macintosh, Windows95/98, and other platforms, designed to interpret and display HTML documents or “pages” similarly.
- Software—including browsers and HTML document development software—is generally available at no cost or low cost, an important consideration for libraries.
- Web-based instructional programs may be updated more efficiently than HyperCard or HyperStudio presentations, audio and videotapes, and print guides. These other delivery methods may be edited easily enough, but the time and cost of reproduction and distribution compared to Web-based instruction limits their appeal for this project.
- Many students at multiple locations may view a Web-based bibliographic instruction program simultaneously.
- The point-and-click technology is familiar to many students; there is little need for extensive pre-instruction software training.

Web pages that incorporate Javascript and similar program elements increase the interactivity of Web pages and client-side computing. Improved interactivity makes the pages more interesting to the learner and provides improved function. Increased client-side computing reduces program interaction with the server, saving the learner’s time and making more efficient use of network resources (Lynch, 1997).

While the bibliographic instruction librarian has primary instructional responsibility for this type of program, the researcher in cooperation with English Department faculty will

conduct this study. This library/faculty partnership should increase the chance that instruction will be relevant to curricular needs. The researcher will ensure that appropriate library resources are available during instruction to reinforce bibliographic instruction objectives.

The discussion sessions are intended both to increase student knowledge and increase participation, transforming students from passive recipients of information to active learners. A 1996 study of college science students examined student views of scheduled classroom discussion. Mark Windschitl found that students in biochemistry and meteorology classes enjoyed the discussion part of lectures and believed that the discussions helped their understanding of the class material. They responded that “it was worth the time spent during lectures to have the small-group discussions.” Professors participating in the study found the discussions sessions beneficial and ranked three discussion techniques as most important:

- “develop questions that stimulate higher-order thinking skills rather than simple recall,
- give students enough time to discuss (three to four minutes, perhaps displayed on a visible timer), and
- give immediate feedback as to what constitutes reasonable responses to each question” (Windschitl, 1999, pp. 26-27).

### Bibliographic Instruction: A Review of the Literature

Bibliographic instruction is the systematic instructional delivery of principles and search strategies relating to libraries and library materials, designed to permit users to accomplish pre-defined research objectives (Salony, 1995, pp. 31-32). Bibliographic instruction is distinguished from library orientation, which is “generally restricted to providing an awareness

of physical location, staff, and services” (Hacker & Rutstein, 1978, p. 107). Some level of bibliographic instruction occurs in every type of library, and in most interactions between librarian and library user. The goal of bibliographic instruction programs is to develop self-sufficiency among learners; not to render librarians obsolete, but to teach learners how to perform routine research, make informed decisions about local and remote library materials, and determine the appropriateness of library resources. Students must rapidly assimilate new methods of library research as they progress through school, and much of this takes place through library-sponsored bibliographic instruction programs. Students comfortable in the library and confident in their ability to identify, locate, and utilize library resources efficiently and effectively will also recognize when additional assistance from the librarian is needed.

Bibliographic instruction as a library practice has roots in the early-1800s, when librarians at Harvard College lectured students on the library’s rare books. At mid-century, Ralph Waldo Emerson “indicated a need for a professor of books” to help students access the library’s collections. Credit courses in library instruction were first introduced toward the end of the 1800s, as libraries sought both to improve student knowledge of library resources, and to enhance the role and standing of the library on campus. Librarians at the University of Rochester, the University of Michigan, and Iowa State University were early leaders in the library instruction movement, which gained attention as the American Library Association (ALA) developed. (Salony, 1995, p. 33-34).

While there emerged agreement among librarians across institutions that bibliographic instruction was important to educational endeavors, approaches to the manner of instruction differed. Some viewed informal point-of-use instruction as critical—the student received assistance at the moment of need, often receiving instruction in the use

of the card catalog and specific reference materials. Others promoted a more formal program, which offered separate library skills courses as part of the college curriculum, or incorporated units of library skills instruction into other college courses. Formal bibliographic instruction program implementation took considerable time to flourish. A 1903 survey of United States colleges by the Reference Section of the ALA found only eleven that provided library instruction. A Bureau of Education survey ten years later found seven of 446 schools required credit bibliographic instruction courses, and nineteen offered elective courses (Salony, 1995, p. 35).

The 1920s and 1930s witnessed a movement toward increased emphasis on bibliographic instruction programs incorporated into institutional curricula. Harvie Branscomb at Duke University, B. Lamar Johnson at Stephens College, and Louis Shores at the George Peabody College of Teachers supported formalized librarian-faculty interaction in the planning and delivery of bibliographic instruction, promoting improved instruction and an enhanced campus role for the library. Long-time library educator Shores subsequently was the founding dean of the Library Science program at Florida State University, where he influenced hundreds of emerging practitioners over a distinguished career.

The 1950s presented an interesting paradox for librarians. With increasing post-War enrollments, library staffs were often overwhelmed by the sheer number of students to participate fully in an instructional capacity in the evolving college and university setting. Orientation programs were more commonplace than instruction, and librarians struggled to restructure formal programs to keep pace with growth. The 1960s and 1970s were more promising for librarians and the developing teacher-librarians. A grassroots movement

promoting bibliographic instruction spread among libraries, thanks in part to the ideas of librarians like Louis Shores and Earlham College's Evan Farber, improved technologies for instructional delivery and the communication and sharing of ideas, and the maturation of professional library organizations. The American Library Association's Association of College and Research Libraries (ACRL) formed a bibliographic instruction interest group in 1971, and published guidelines for instruction six years later (Salony, 1995, pp. 39-42). Instructional delivery was enhanced by the overhead projector, slide and tape presentations, and transportable cassette tape library tours.

The trend since the 1970s has been toward increased collaboration with classroom faculty, with the renewed philosophy that bibliographic instruction related to specific course assignments has more relevance to learners than isolated facts presented by the librarian (Hanson, 1995). Bibliographic instruction for classroom faculty has been offered by some libraries, both to teach faculty about new resources and programs, and to encourage faculty to support the incremental development of library skills over the semester (Lipman & King-Blandford, 1997, p. 25). Self-paced computer-aided instruction emerged as a popular instructional medium during the late 1980s and early 1990s.

The availability of emerging technologies affects the skills bibliographic instruction librarians must teach students, and offers novel delivery methods for bibliographic instruction itself. Roxanne Mendrinis, a strong advocate of library media centers and the integration of technology into the learning environment, conducted two studies in the late 1980s and early 1990s into the importance and prevalence of CD-ROM resources in school library media centers. Her interests subsequently developed into an investigation of using other technologies in media centers and classrooms, and forms the basis for her book

Building Information Literacy Using High Technology: A Guide for Schools and Libraries.

Mendrinós' work suggests through case studies, lesson plans, and a chapter on "information literacy in the curriculum" that student experiences with technology in the media center help them gather, analyze, evaluate, and apply information, prompting students to develop personal inquiry and research habits applicable out of school (Mendrinós, 1994).

Nancy Kline studied librarians' views on the impact of technological change on bibliographic instruction in 1994. Her study "sought an informed consensus among fifty-five experts to the general research question: What do experts within the leading American academic libraries believe will be the impact of changes in computing and telecommunications technology between the years 1995 and 2005 on bibliographic instruction and the broader academic curriculum?" Three six-question Delphi cumulative questionnaires were distributed over a five-month period to reference department heads responsible for managing bibliographic instruction in libraries belonging to the Association of Research Libraries (ARL). Kline found that a full range of technology has been incorporated in varying degrees into bibliographic instruction programs, that the greatest impact will come from library online catalogs and other networks, and that BI programs will continue to evolve. Programs will become more varied, with more individualized instruction and increased emphasis on identification and retrieval of remote resources. Instructors will "continue to focus consistently on universal intellectual, philosophical, and social issues, as well as on planning for the future" (Kline, 1994).

That the increased number of technologically sophisticated search and retrieval tools will continue to affect BI programs was also supported by the research of Anne Maio in a 1995 University of Connecticut study. Maio sent Likert-style surveys to 1000 faculty at three

Connecticut institutions, to determine which types of print and electronic resources they use and instruct their students to use, to learn “faculty opinions of the way students should learn about information research, and whether students’ literature searches were adequately carried out.” Respondents indicated that a large percentage of faculty require their students to use information resources, and most faculty prefer that librarians instruct students in the identification and use of appropriate resources. Over half “were satisfied with the academic quality of students’ literature searches.” The greatest faculty demand for library resources and encouragement of student use was in business and professional programs and the humanities; faculty in other disciplines were less likely to use and require the use of electronic mail journals, texts, and listservs (Maio, 1995).

Indeed, practitioners and faculty in all fields do not greet the availability of technologies with the same enthusiasm; the proliferation of technology-intensive library and research products does not solve all needs of all researchers. A study of New York academic historians conducted from 1992 to 1996 found that while they have become “nearly universal users of personal computers for word processing and electronic mail communications, they are divided in their use of other technologies, including listservs, CD-ROMs, and the World Wide Web.” Historians typically do not accept facsimile documents in place of original documents, and “were opposed to the potential diversion of travel dollars to machine and software purchases.” Facsimile documents provide the content of originals, but visits to document repositories offer a view of documents in authentic contexts (Andersen, 1996). The increased availability of online catalogs and Web-based document catalogs since this study was completed may alleviate historians’ concerns, but libraries and bibliographic instruction librarians must consider potential barriers to the use of electronic resources.

Technology continues to influence instruction on two principal levels. Technology as an information-providing and information-gathering tool must be addressed, and technology as a teaching tool must be utilized by librarians modeling today's technology. Librarians must still be concerned with "readability of handouts and overhead transparencies," and must be capable of troubleshooting equipment, establishing telecommunications connections, and evaluate Internet sites, all of which complicates "the thinking and preparation needed in teaching information resources and search strategies to students" (Byron, 1995, p. 242).

#### Computer Assisted Instruction in Libraries

Studies of the effectiveness of computer-assisted instruction (CAI) in bibliographic instruction have produced mixed findings, although it is possible that today's sophisticated authoring systems and computers offer more powerful instructional design and delivery than computers did in the early and late 1980s and early 1990s. Eighty-six University of Wyoming undergraduate education and psychology students participated in a 1982 study on the effectiveness of lectures, programmed texts, and CAI on their abilities to effectively use Psychological Abstracts. A pretest was followed by instruction, a posttest, and an attitude survey. Although at the .05 level there were no statistically significant differences in achievement between treatments; students using the CAI indicated a statistically significant preference for that delivery method (Whitson, 1982).

Five years later a similar study was conducted at Penn State. Two levels of feedback were incorporated into the CAI program (simple knowledge of correct response feedback, and elaborate informative/instructional feedback), and the lecture treatment included oral

questioning and feedback. One hundred and two upperclass students in a technical writing course were randomly assigned to one of the three treatments, each of which was designed to teach search strategy and the use of bibliographic sources for scientific research in a ninety-minute session. "The CAI with simple feedback produced significantly better achievement than the lecture presentation." The researcher concluded, "CAI in some cases can be a superior method of producing achievement levels for college students, and that simple feedback is more efficient." Individualized library research instruction through CAI was an acknowledged benefit (Sickler, 1987).

Lesley Farmer examined the use of HyperCard as a CAI and learning tool for high school students. She found CAI an effective alternative to lecture-based library skills instruction, "particularly since computers are well suited to deliver repetitious instructions;" they are "patient." Computer programs which include both text and graphics hold student interest, "can be designed to make use of different learning styles and needs," and provide hand-on learning and practice. Farmer views interactivity as central to the flexibility of effective CAI programs, requiring learner response and providing meaningful feedback (Farmer, 1993, pp. 15-16).

Mattison Jenkins created a computer-based bibliographic instruction tutorial program for freshmen English students as part of a 1993 study at Delta State University. The tutorial included instruction in broadening and narrowing term paper topics, using the encyclopedia, the online catalog, online periodical and government document databases, and Library of Congress subject headings. Students were required to select and develop a term paper topic; reference librarians reviewed a random sample of student bibliographies to gauge the appropriateness of materials selected for the topic, and compared data with bibliographies

generated by control group students, who had received library-based instruction. Pretest and posttest scores were examined, and the researcher identified these findings: the CAI group achieved as well as the library-based instruction group for the specific bibliographic skills covered; teachers can utilize the tutorial program for out-of-class assignments to teach specific skills; the CAI group may have had the advantage of added concentration over the library-based instruction group or the convenience of program accessibility (Jenkins, 1993). The effect of the CAI on the development of the bibliography was unclear.

### Web-Based Instruction: A Review of the Literature

Technology is viewed as an instructional and learning benefit by educators who cite numerous studies between 1970 and 1985 that indicated “students who received help from computers generally learned more in classes, remembered longer, and spent less instructional time learning their lessons.” These studies focused on a range of grade levels and computer applications, and have been supported by more recent research. A meta-analysis of thirty-six such studies found that “the instructional use of the computer increases students’ academic achievement” (Khalili & Shashaani, 1994). University of Michigan researchers in 1991 found “a 10-15% increase in achievement scores and a 30% increase in student productivity when computers were used as a teaching tool” (Villano, 1995).

Recent trends have focused on developing a telecommunications infrastructure to support improved access to Internet and Web resources. A 1996 survey of 272 North Carolina public schools indicated ninety-nine percent of schools had a technology plan, and sixty-one percent had some form of funding for telecommunications. Seventy-one percent reported some level of Internet access for teachers, while sixty-nine percent of all schools reported availability

of a private telecommunications line, modem, and software (Sox, 1996). College and university access to the Internet has often preceded availability of this technology in our schools. Viewed simultaneously as a marketing and instructional tool, the Internet has become the subject and medium of instruction on many campuses. Libraries rely on the Internet for acquisitions, access to the online catalog and electronic resources, and communications, and have adopted the medium for bibliographic instruction.

Accordingly, recent articles have examined and encouraged a move toward Internet-supported and Internet-based instruction in education and libraries. The SNAPdragon project conducted under the auspices of the UCLA Graduate School of Education and Information Studies in 1996 investigated elementary school student interaction with the Web, including student evaluation of online resources (Kafia & Bates, 1997). The project modeled cooperation between classroom teachers and media specialists, and included six distinct instructional project components. Among other observations it was noted that students preferred visually appealing sites with concise, simple text, and that “students have a low tolerance for long download times.”

Papers and articles designed to promote creation of effective instructional Web sites have also appeared with greater frequency in the past two years. Occasionally these take the form of Web pages themselves, combining dynamic graphical elements with text (Whitley, 1996). Other articles have focused on the presentation of information on the Web, including evaluation of existing sites of interest to librarians and other educators (MacDonald, 1997).

The literature concerning integration of Web-based instruction for bibliographic instruction suggests this application is in its infancy; it is hoped that this study will contribute meaningfully to an expanding research base.

### The Web-based Instructional Program

The Web-based program will be developed using HTML and made accessible for initial review and field testing on the Web. The lesson will be designed for optimal cross-platform compatibility using Netscape Navigator or Microsoft Internet Explorer 3.0 or later. The bibliographic instruction program will teach students essential library orientation information—the location of the online catalog, reference and general book collection, circulation desk, and CD-ROM workstations, and general strategies for using these resources. These skills are key to self-sufficiency in any library setting. Lesson review following each of the instructional components will reinforce student mastery and improve retention of lesson concepts.

An effective way to provide instruction is through hands-on practice with the same problem-solving tools used in a real-world setting. These hands-on practice and learning activities will be incorporated into student participation for this study. Beyond the pertinence of these specific skills, instruction of this type should introduce students to some level of abstract visualization necessary for problem solving. It is hoped that through this instruction students will learn the importance of accurately interpreting visual information and discrimination of similar data.

### Instructional Objectives

The following instructional objectives are based on the precepts of Robert F. Mager, who identified three definitions crucial to measuring an instructional objective (Mager, 1962):

- Conditions—What the student will be given or not given as an aid to completing the program;
- Performance—What the students will accomplish; and
- Criteria—How well the student will accomplish the terminal objective.

Select objectives have two performance criteria; an efficiency standard, and a time-based standard. While all objectives must be mastered for effective library use, several must be mastered within a distinct time frame, to encourage efficient student research. A high degree of efficiency is necessary during this learning and the post-instructional use of the library, as resources must be identified in a precise manner to be of any use.

The design of the instructional program will include content typically presented to groups of students during a class tour and orientation session lasting thirty minutes, and which ideally is coordinated with classroom instruction and research projects. The program will facilitate self-pacing for students at various achievement levels, and will include three broad instructional components:

- The first instructional component will introduce students to the location of library materials and resources; from finding aids such as the online catalog and other computer workstations; to materials, including the book and periodical collections, CD-ROM and Internet resources. Library personnel will be introduced and services available at the Circulation Desk will be described.

- The second instructional component will demonstrate application of library resources and strategies for using these resources in sample classroom-assigned projects. This will range from basic technical proficiencies necessary to use the online catalog to more complex search strategies and familiarity with common library technologies—Web browsers, CD-ROM workstations, and print materials.
- The third instructional component is central to any form of bibliographic instruction; developing proficient research and investigation techniques, learning to distinguish between materials appropriate for a specific project and those that do not meet the student's need as completely. Students must learn to determine whether and how completely resources meet self-imposed or professor-imposed criteria. A series of guidelines incorporated into the instructional program will provide the structure for this component of instruction.

A Javascript-based quiz will be presented at the end of each instructional component, with immediate feedback provided to the learner to reinforce lesson content. Benchmark levels for several subcomponents of the second instructional component include:

1. Using the online terminal, the learner will successfully complete a specified author search, title search, and subject search.
2. The learner will identify a given title and write the call number with 100% accuracy, within three minutes after the search is initiated.
3. The learner will describe the elements of a call number with 100% accuracy.
4. The learner will locate the identified book in the library with 100% accuracy, within ten minutes after beginning a search. In the event that the book is not on the shelf, the learner will identify the precise location for the item.

5. The learner will score at least 90% on the posttest immediately following instruction.

### Methods

Students in four English Composition (ENG 102) classes at Florida Southern College will complete a computer experience and demographic survey.

Students in two English Composition (ENG 102) classes at Florida Southern College will complete the Web-based bibliographic instruction program in the campus computer lab during class time. Following completion of the Web-based program, the students will complete an online exercise designed to provide practice with the skills introduced in the Web-based program. Immediately following instruction, the students will complete a student worksheet designed to measure comprehension and the student's ability to apply lesson content in the library setting.

Students in two additional English Composition (ENG 102) classes at Florida Southern College will also complete the Web-based bibliographic instruction program in the campus computer lab. Following completion of the Web-based program, the students will meet with the researcher in a guided, scripted supplemental discussion session to review lesson content, address students' questions, and provide live feedback. Immediately following instruction, these students will complete the same student worksheet designed to measure comprehension and their ability to apply lesson content in the library setting.

Students in all four classes will complete a same-day post-instructional survey to determine learner satisfaction with the instructional method, and a follow-up test administered four weeks after instruction.

The validity of the computer experience survey, student worksheet and follow-up test (performance measures), and learner satisfaction survey will be addressed through a content analysis by at least three experts in the fields of instructional design and library science. A repeated measures ANOVA will be used to examine data generated by the study.

### Research Questions

#### Main Effects:

1.1 Is there a statistically significant difference in performance (as measured by pretest, posttest, and follow-up test scores) between students who complete the Web-based bibliographic instruction program and online exercise, and those students who complete the Web-based bibliographic instruction program with supplemental discussion?

1.2 Is there a statistically significant difference in learner satisfaction between students who complete the Web-based bibliographic instruction program and online exercise, and those students who complete the Web-based bibliographic instruction program with supplemental discussion?

1.3 Is there a statistically significant difference in performance (as measured by pretest, posttest, and follow-up test scores) between novice, intermediate, and advanced computer users?

1.4 Is there a statistically significant difference in learner satisfaction between novice, intermediate, and advanced computer users?

#### Interaction Effects:

2.1 Is there a statistically significant difference in performance (as measured by pretest, posttest, and follow-up test scores) between novice, intermediate, and advanced computer

users who complete the Web-based bibliographic instruction program with supplemental discussion?

2.2 Is there a statistically significant difference in learner satisfaction between novice, intermediate, and advanced computer users who complete the Web-based bibliographic instruction program with supplemental discussion?

2.3 Is there a statistically significant difference in performance (as measured by pretest, posttest, and follow-up test scores) between novice, intermediate, and advanced computer users who complete the Web-based bibliographic instruction program and online exercise?

2.4 Is there a statistically significant difference in learner satisfaction between novice, intermediate, and advanced computer users who complete the Web-based bibliographic and online exercise?

### Summary

It is not known whether students who use the instructional program and have the benefit of supplemental discussion will perform at a higher proficiency level on the worksheet than students who receive instruction through the Web-based instructional program and an online exercise. Results of the study will influence research recommendations; either that the supplemental discussion should be incorporated into bibliographic instruction, or that the supplemental discussion offers no statistically significant advantage over Web-based instruction and the practice provided by online exercises.

The essential ingredients for successful formulation of the Web-based bibliographic instruction include the willingness to try an emerging means of instructional development and delivery, access to an Internet account or server with disk space for Web page creation and

maintenance, a basic understanding of HTML, and sufficient hours dedicated to the project.

This study should encourage librarians and faculty to work together to create similar programs supportive of the curriculum, engendering the collaborative spirit vital to building collegial professional relationships and improved instruction.

References

Andersen, D. L. (1996). User-driven technologies: Assessing the information needs of history faculty as a special user population [On-line]. Abstract from: OCLC File: Dissertation Abstracts Online Item: AAG9629746

Byron, S. (1995). Preparing to teach in cyberspace: User education in real and virtual libraries. In L. M. Martin (Ed.), Library instruction revisited: Bibliographic instruction comes of age (pp. 241-247). New York: Haworth.

Farmer, L. S. J. (1993). Teaching skills by HyperCard. Book Report, 12(3): 15-16.

Hacker, B. L., & Rutstein, J. S. (1978). Educating large numbers of users in university libraries: An analysis and a case study. In J. Lubans, Jr. (Ed.). Progress in educating the library user (pp. 105-123). New York: Bowker.

Hanson, M. G. (1995). Joining the conversation: Collaborative learning and bibliographic instruction. In L. M. Martin (Ed.). Library instruction revisited: Bibliographic instruction comes of age (pp. 147-159). New York: Haworth.

Jenkins, M. S. (1993). Development and evaluation of a computer-based tutorial program for the instruction of bibliographic skills [On-line]. Abstract from: OCLC File: Dissertation Abstracts Online Item: AAG9312795

Kafia, Y., & Bates, M. J. (1997). Internet web-searching instruction in the elementary classroom: Building a foundation for information literacy. School Library Media Quarterly, 25(2): 103-111.

Khalili, A. & Shashaani, L. (1994). The effectiveness of computer applications: A meta-analysis. Journal of Research on Computing in Education, 27(1): 49.

Kline, N. M. (1994). Technological change and bibliographic instruction: A Delphi study of American academic librarians' views [On-line]. Abstract from: OCLC File:

Dissertation Abstracts Online Item: AAI9525786

Lipman, C., & King-Blandford, M. (1997). Innovation and collaboration brings forth a new approach to bibliographic instruction: Teach the teachers. Journal of Interlibrary Loan, Document Delivery and Information Supply, 8(2), 21-31.

Lynch, K. (1997). Cross-browser dynamic HTML. DHTML Zone [On-line]. Available World Wide Web: <http://www.dhtmlzone.com/articles/dhtml.html>

MacDonald, R. M. (1997) The media center home page: Essential design considerations. Ohio Media Spectrum, 49(1): 28-34.

Mager, R. F. (1962). Preparing instructional objectives. Belmont, CA: Fearon Publishers.

Maio, A. K. (1995). The instruction of undergraduates in print and electronic information resources [On-line]. Abstract from: OCLC File: Dissertation Abstracts Online Item: AAI9611017

Mendrinis, R. (1994). Building information literacy using high technology: A guide for schools and libraries. Englewood, CO: Libraries Unlimited.

Salony, M. F. (1995). The history of bibliographic instruction: Changing trends from books to the electronic world. In L. M. Martin (Ed.), Library instruction revisited: Bibliographic instruction comes of age (pp. 31-51). New York: Haworth.

Sickler, N. G. (1987). The effects of different modes of instruction and feedback on the achievement of students with differing levels of locus-of-control [On-line]. Abstract from:

OCLC File: Dissertation Abstracts Online Item: AAG8728078

Sox, C. W. (1996). Telecommunications: Does it make a difference? Paper presented at the Annual Convention of the American Vocational Association, Cincinnati, OH. (ERIC Document Reproduction Service No. ED 403 880)

Villano, D. (1995). Cyber teachers. Florida Trend, 38(5): 52.

Whitley, K. M. (1996). Instruction on the web: Authoring tutorials in HTML. Untangling the web: Proceedings of the conference sponsored by the Librarians Association of the University of California, Santa Barbara, and Friends of the UCSB Library. (ERIC Document Reproduction Service No. ED 403 898)

Whitson, D. L. (1982). A comparison of microcomputer-assisted instruction, programmed instruction and the traditional lecture approach to bibliographic instruction in higher education [On-line]. Abstract from: OCLC File: Dissertation Abstracts Online Item: AAG8310155

Windschitl, M. (1999). Using small-group discussions in science lectures. College Teaching, 47(1): 23-27.