

Applying Instructional Design Principles to the Development of Web-Based Tutorials For Library Instruction

By
Anne M. Prestamo
Coordinator, Digital Library Services
Edmon Low Library
Oklahoma State University

Libraries are committing growing portions of their materials budgets to the acquisition and licensing of electronic resources. In most libraries, providing remote access to these resources is an imperative. Remote access is causing librarians to reflect on and evaluate the ways in which instruction in the use of these resources is provided. Bibliographic instruction has typically taken the form of face-to-face encounters, either in a classroom setting, or on a one-to-one basis in the library. Many libraries have also created extensive collections of printed guides to assist users. However, remote access to electronic resources allows users to utilize these resources without physically coming to the library. While this is a great convenience, remote access leaves users on their own, without the benefit of a librarian's assistance or printed instructions. New methods of providing instruction to serve these needs are required. Web-based tutorials represent a possible solution for this need.

Many early attempts at Web-based training (WBT) have simply meant converting printed guides to Webpages. Mark Fritz (1997a) describes it this way: "The earliest attempts at WBT should not have been called training; 'information delivery' would have been more accurate With text alone you end up simply shoveling linear information to a learner. Unfortunately, this sort of 'shovelware' is the current state-of-the-art of WBT."

Donald T. Hawkins (1997) shares this view: "Although there are currently many Web sites that deliver information to their users, few provide true training courses. The distinction is important; training involves skill-building, practice, tracking and testing the progress of the students, while simple information delivery does not." (p. 73)

Brandon Hall points out that designing for the Web is different than designing printed material. Not only should graphics be eye-catching, they can also be used to build a clear and intuitive path between areas of information. Linking of pages within a module must be carefully thought out, enabling to users to navigate the pages without becoming confused. (p. 187)

Although Web-based instruction is in its formative stages, there is a growing body of literature that addresses design issues. An extensive reading list can be found at the conclusion of this paper.

This paper will outline the design process used in the creation of the Library Research Survival Guide for BIOL 1114, an undergraduate Biological Sciences course at Oklahoma State University. The creation of the tutorials coincided with a major revision in the teaching methodology and curriculum for the course. Throughout the process, the Instructional Designer worked closely with the Faculty Coordinator for the course to ensure that the tutorials would meet the needs of the students in the course.

Purpose

The purpose of this project was to provide students in Biological Sciences (BIOL) 1114 with the library research skills necessary to successfully complete their laboratory assignments. Students are required to locate and cite materials to support their experimental designs, procedures, and conclusions. Often their research is done from a lab in the Life Sciences West Building.

The overall project contains training modules that outline procedures for identifying and locating book, periodical, and Web materials. It would be desirable for students who are unfamiliar with the Library to complete the entire series of training modules. However, the tutorial was segmented to allow students to easily access individual modules for review or quick reference.

Audience

The majority of students who enroll in BIOL 1114 are freshman. For many, this course is their first encounter with the OSU Library's services and resources.

Media Selection

One of the overriding goals of the project was to make the training material available to students in the Life Sciences West laboratory, as well as other locations on and off campus. Based on an extensive literature review conducted by the Project Designer in Spring 1998, it was determined that delivery via the Web would be the preferred method. While other multimedia authoring tools were considered, it was determined that Web pages were the most logical choice. Accessing the tutorial will require no special software other than a Web browser. In a Web page format the tutorial will be platform independent.

The possibility exists to construct a more sophisticated method of presenting the review questions at the end of each instruction module, using either forms with CGI scripting or JAVA applets. However, each of these methods present some potential problems for users, due to the fact that not all Web browsers support forms and/or JAVA. Therefore, for this project it was decided to implement the review questions using simple hyperlinks.

System Requirements

- Computer with Netscape 3.0 (or higher) or Microsoft Internet Explorer 3.0 (or higher)
- For optimal display, screen resolution should be set at 1024 x 768
- Network or modem (28.8 or higher, preferred) Internet connection
- Laser or inkjet printer (optional)

Instructional Objectives

Upon completion of the training modules, students should be able to:

1. Describe the physical layout, services, and resources of OSU's Edmon Low Library.
2. Locate books using the Library's Online Catalog.
3. Recognize and understand the differences between magazines and scholarly journals.
4. Identify and obtain copies of periodical articles pertinent to their topic or need.
5. Conduct searches for information on the World Wide Web.
6. Critically evaluate Web information.
7. Construct suitable bibliographic citations for book, periodical, and Web materials.

Treatment

As stated earlier, the purpose of this project was to provide students in Biological Sciences (BIOL) 1114 with the library research skills necessary to successfully complete

their laboratory assignments. The brief outline below summarizes the structure for the entire series of modules. The content of the Web Resources Module is outlined in greater detail following the series outline.

Overall Structure of the Module Series

I. Introductory Material

- A. Title
- B. Welcome & Objectives
- C. Navigation
- D. Menu

II. Books

- A. Using the OSU Library Online Catalog
- B. Locating a Book on the Shelf
- C. Checking Out a Book
- D. Citing Books or Chapters of Books
- E. Interlibrary Loan

III. Periodical Articles

- A. Periodical Article Types
- B. Periodical Databases
 - 1. Using ProQuest Direct(r)
 - 2. Using Expanded Academic Index(r)
 - 3. Using Specialized Subject Indexes
- C. Locating a Periodical Article on the Shelf
- D. Citing Periodical Articles
- E. Interlibrary Loan

IV. Web Resources

- A. Types of Web Resources
- B. Evaluating Web Resources
- C. Searching the Web
 - 1. Subject Guides
 - 2. Search Engines
- D. Citing Web Resources

Web Resources Module - Instructional Content Outline

Each section designated by a Roman numeral above was segmented into varying numbers of individual instruction screens. Review questions were interspersed with the instruction screens as appropriate. Positive and negative feedback were provided for each review question.

I. Using the Web for Research (Storyboard - Instruction Screen)

- A. Types of Web Resources
- B. Delivery vs. Content
- C. Understanding URLs
 - 1. .edu, .com, .gov, .org, .net, .us, (Storyboard - Instruction Screen with link to Review Question)
 - 2. Directory and File Paths
 - 3. ~/~joe_smith

II. Evaluating Web Resources

- A. Authority
- B. Accuracy
- C. Currency
- D. Scope & Depth
- E. Bias

III. Searching the Web

- A. Subject Guides
 - 1. What is a Subject Guide?
 - 2. How Do I Use a Subject Guide?
 - 3. Examples of Subject Guides
 - a. Yahoo
 - b. World Wide Web Virtual Library
 - c. OSU Library Web Resources & Other Library Subject Guides

B. Using Web Search Engines

IV. Citing Web Resources

- A. Style Manuals for BIOL 1114
 - 1. Scientific Style and Format : The CBE Manual for Authors, Editors, and Publishers
 - 2. A Short Guide to Writing About Biology
- B. Required Elements
- C. Sample Citations

Flowchart

A flowchart was created to visually represent the linkages between and within the various modules. The Main Menu provides entry points to the three modules. Each module

contains introductory material that outlines the objectives of that module. Instructional content is presented on multiple pages, with review questions interspersed at key points. Breaking the instructional content into multiple pages eliminates the need for users to scroll down through lengthy pages, a common pitfall of Web-based training. Users are given immediate feedback based on their response to each question. In the flowchart, correct responses are represented by "R", and incorrect responses by "W". If an incorrect response is selected users are provided with the correct information before they continue to the next section. At any point, users have the option of returning to the menu for the given module, returning to the Main Menu, or exiting the tutorial.

Figure 1 Flowchart Storyboard

Based on the flowchart, a storyboard of Webpage templates was created. Each of these twelve templates represented a unique page type. These templates were later modified with the specific content and links required for each page in a given module. Use of the templates not only speeds up the process, but ensures that navigation buttons are consistent and uniformly placed. The templates were:

- Title
- Welcome & Objectives
- Navigation
- Main Menu
- Module Menu
- Instruction Screen
- Instruction Screen with link to Review Question
- Review Question
- Positive Feedback
- Negative Feedback
- Quit
- Goodbye

Storyboard Samples



Figure 2. Storyboard - Navigation (Click for full-size image)

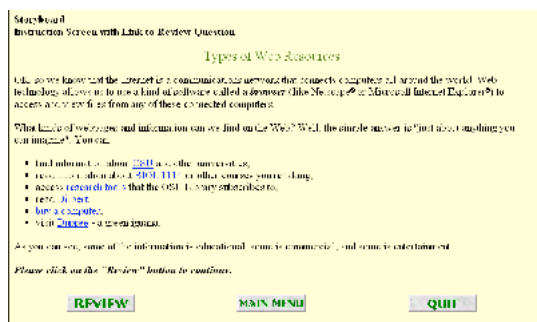


Figure 3. Storyboard - Instruction Screen with link to Review Question (Click for full-size image)

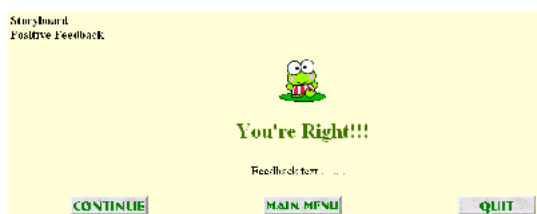


Figure 4. Storyboard - Positive Feedback (Click for full-size image)



Figure 5 Storyboard - Quit

Formative Evaluation and Beta Testing

As each module was developed evaluation and testing was conducted. Subjects participating in the testing included librarians, BIOL 1114 faculty and teaching assistants, undergraduate students, and graduate students in an Instructional Design course. It should be mentioned that the course was not being taught during the development period. Therefore, the undergraduate students in the initial testing and evaluation were drawn from a variety of majors. Based on comments from the participants, changes were made in layout and content to ensure clarity and ease of navigation.

Implementation

Initial implementation occurred during Fall Semester 1998. In addition to the Web version of the tutorial, an abridged print version was created and included in the students' laboratory manual. The lab manual directed students to the Web version. Links to the Web tutorial were also placed in the Webpages for the course. Usage of the tutorial was tracked on a weekly basis.

Revision and Maintenance

Inclusion of links to external Webpages requires that these links be checked on a regular basis and corrected or updated as necessary. Vendor upgrades to search interfaces have also necessitated replacement of graphics and instructional content.

Evaluation

At the conclusion of the Spring 1999 semester the Project Designer and Faculty Coordinator will review the project and determine its future direction. Inputs for this decision will include:

1. Statistics on use of the tutorial
2. Faculty impressions of the success and suitability of the tutorial
3. Comments about the tutorial from student course evaluations

Conclusion

As traditional methods of instructional delivery are influenced by new technologies, the need to continually re-examine and refine existing methods of bibliographic instruction will be critical. This project represents a first attempt at moving in a new direction, and will require evaluation, updating, and refinement.

The Library Research Survival Guide for BIOL 1114 can be accessed using a Web browser at:

<http://www.library.okstate.edu/dept/sed/prestamo/nettrain/pqento.htm>

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