



Research Brief #20

1998

Evaluating the Effectiveness of Interactive Multimedia for Disseminating Complex Environmental Research

Introduction

In the first phase of this technology transfer project, the researchers created a World Wide Web site with an introductory tutorial on *in-situ* capping of contaminated sites. Development of this demonstration site required:

- completion of the text for the *in-situ* capping tutorial;
- identification and compilation of the visual resources needed for the project;
- selection of an appropriate interactive multimedia application for the project;
- authoring of the multimedia prototype;
- development of supporting graphics and animations that illustrate basic processes about *in-situ* capping.

In the second phase, researchers have:

- expanded the site's subject matter to include technical briefs and research findings;
- publicized the site to a variety of audiences;
- sought further evaluations of the tutorial's effectiveness through evaluations of selected subject-matter experts and end users;
- improved the site's animations.

Overview—The Capping Web Site

The capping web site (<http://eoeml-www.gtri.gatech.edu/home/markh/capping/>) is an introduction to capping—a low-cost, low-technology alternative for keeping contaminated sediments from polluting lakes, rivers, bays, and coastal estuaries.

Environmental management professionals usually have considered treatment or removal to be the

appropriate technologies to use when remediating contaminated sediments. However, recent research indicates that sealing the sediments with a coating of sand, silt, rock, and/or geotextiles also can provide an acceptable level of protection against the desorption and return of pollutants into the water column. This technology is known as *in-situ* capping.

In-situ caps are designed to seal contaminated sediments in place for long periods of time. Because capping does not call for removal or treatment of these pollutants, as do the most widely used remediation methods, *in-situ* capping is somewhat controversial.

In-situ capping is not a widely used option, since it runs counter to the assumptions of remediators' conventional practices. The purpose of this web-based tutorial is to introduce potential users to the practice. This web site provides a concise overview of the technology, including recommended practices and situations where it may be used most effectively. It also includes technical resources for those who are familiar with the technology. The tutorial has been expanded through the addition of technical briefs on effective capping practices developed by the Waterways Experiment Station of the U.S. Army Corps of Engineers. The web site has also been enhanced with abstracts of academic research related to *in-situ* capping. The site includes text, animations of basic capping processes, illustrations, and photographs.

The site includes extensive navigational tools to assist the user in moving around the various pages. The learning material is presented in such

continued on back

Summary of the Problem

Using the Internet to transfer information in the form of text and graphics is becoming increasingly familiar and accepted. The World Wide Web is a highly effective medium for conveying technical research information, both because of its ability to provide a variety of learning paths via hypertextual links and its capacity to integrate multiple media into single enriched information presentations. For those who are used to only the print medium of communication, use of the World Wide Web presents unique problems as well as opportunities, such as the need to simultaneously:

- design for nonlinear presentation of information
- facilitate multiple learning paths appropriate to users with different knowledge and needs
- maintain topical coherence in a constantly expanding information resource.

An emerging body of research suggests that interactive multimedia presentation technologies offer unique advantages for various types of information-dissemination efforts, including technology transfer and training programs. Georgia Tech technology transfer specialists are evaluating this claim by developing and testing an interactive multimedia tutorial to disseminate knowledge about a complex environmental research topic: *in-situ* capping of contaminated sediments. *In-situ* capping has been one of the focal points of research at the South and Southwest region of the Hazardous Substance Research Center (HSRC/S&SW).

a way as to meet the needs of the various users, based on their interests and expertise. For example, the technical briefs provide more detailed information on how to use the capping technology, and abstracts of recent and pertinent academic research publications are easily accessible.

Site Design

Basic guidelines of effective online information design were used as a starting point for designing this site as well as the overall HSRC web site. The guidelines include, but aren't limited to the following:

- Graphics are important contributors to communication; yet when overused or when the files are memory-intensive they can cause web pages to load more slowly and can detract from important textual information.
- Navigational tools must be provided on every page to allow users to move freely around the site.
- Advanced web effects and features, such as animations, are difficult for "lay" users to install and must be accompanied by instructions and links to software resources.
- Although text explanations should be condensed on the web, high quality written material is still highly valued by environmental audiences who retrieve information online.
- Linking schemes should be made as easy to understand as possible — the conventions of interactivity still have not been widely absorbed by learners nor are methods of reaching online novices most effectively understood by web communicators.

Evaluating the Site

This World Wide Web site was awarded an Award of Merit by the Atlanta Chapter of the Society for Technical Communication online communications competition in the Information/Reference category. The researchers have also captured evaluative information through informal conversations with environmental

professionals and via a survey questionnaire. The 17-question survey included questions on topics which ranged from the user's equipment and ability to access the site to specific information regarding which section in the site was most useful and how helpful the animations were. Ten out of 70 recipients responded to the survey and generally found the site easy to navigate. The respondents were roughly split in assessing the site as adequate or an excellent source of information on capping technology. None of those who responded attempted or were able to access the site's color animations of basic capping processes.

Lessons Learned

There is a built-in tradeoff between giving users freedom to choose their own paths through the material and narrowly prescribing users' learning paths. When users have freedom to choose their paths, they naturally have more autonomy to meet their own needs, while in the latter case they may well be better oriented within the site. The users of this web site have indicated that they prefer orientation devices such as color-coded bars and navigation links on every page to assist them in moving through complex material. The researchers also found that while it is simple to segregate material intended for novice and expert audiences, it is more difficult to create a structure that allows the users to navigate between different information sets. Survey respondents indicated that users have more difficulty than expected in using advanced learning tools, such as animations of basic capping processes. Some users had difficulty recognizing how to download an Adobe Acrobat file of a brochure containing the Web site's images and text (even though a button on the home page announced the availability of this feature). These findings illustrate the need for more knowledge about how to make available sophisticated features (animations for instance) in language or graphical signs that are immediately recognizable and nonthreatening.



Director:

Danny D. Reible, Ph.D.
Louisiana State University
Baton Rouge, Louisiana 70803
Phone: 225/388-6770
FAX: 225/388-5043

Co-Directors:

F. Michael Saunders, Ph.D.
Georgia Institute of Technology
Atlanta, Georgia 30332
Phone: 404/894-7693
FAX: 404/894-9724

C. Herb Ward, Ph.D.
Rice University
Houston, Texas 77251
Phone: 713/527-4086
FAX: 713/285-5203

Training & Technology Transfer Coordinator:

Leigh F. McElvaney
Georgia Tech Research Institute
Atlanta, Georgia 30332
Phone: 404/894-7898
FAX: 404/894-2184

Principal Investigator

Georgia Institute of Technology
Mark Hodges
Project Title: *Evaluating the Effectiveness of Interactive Multimedia for Disseminating Complex Environmental Research Information*

Research Briefs are on the web at:
www.hsrc.org/hsrc/html/rbriefs.html