



International Waters: Learning Exchange and Resource Network (IW:LEARN)

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International Waters Web Developers' Workshop Guide



Jerod Clabaugh and Dann Sklarew

IW:LEARN

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International Waters: LEARN is an innovative inter-institutional partnership to build a Web-based 'knowledge community' among transboundary waters projects. Its purpose is to expand knowledge-sharing so that people who live in and manage transboundary water systems can better learn from and teach each other." See <http://www.iwlearn.org> for details.





International Waters Web Developers' Workshop

Purpose and Schedule

The International Waters (IW) Web Developers' Workshop aims to train Web developers to utilize Web tools to realize their international waters project initiatives. In particular, the workshop will:

Preparation, On-line and Day 1 [Sunday, October 28, 1400-1700h]

- Identify how [Web development helps](#) meet IW projects' goals and objectives
- Characterize the state of [technical capacities](#) among IW projects

Day 2 [Monday, October 29, 0900-1700h]

- Model [best practices and useful tools](#) for effective Web site design
- Test mechanisms for delivering [news, news feeds, and newsletters](#) via Internet
- Evaluate tools, indicators and methods for effective [electronic IW forums](#)

Day 3 [Tuesday, October 30, 0900-1700h]

- Create viable and sustainable on-line [documentation systems](#) for effective discovery
- Identify the most appropriate [database and search engine](#) alternatives for serving IW projects' knowledge products and information resources.
- Apply [metadata standards](#) to the development of on-line documentation systems and advanced search engines

Day 4 [Wednesday, October 31, 0900-12http00h]

- Discuss roles for Geographic Information Systems ([GIS](#)) on IW Web sites
- Explore usability of various Distance Learning ([DL](#)) tools for IW Web sites
- Develop personal action plan to [implement lessons](#) from this workshop, with 30 day milestone

Implementation, On-line [November 1 through December 31, 2001]

- Implement personal action plans at home office, in consultation with other workshop participants
- Share implemented products with rest of workshop participants and IW community by the end of 2001

Throughout this process, we will also share experiences and models between participants as well as from other International Waters projects not represented in person.

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How can the Web help International Waters projects?

Overview:

In developing and implementing transboundary initiatives, International Waters (IW) projects worldwide are making a substantial investment in information technologies. The use of the World Wide Web for coordination and outreach across participating countries is of particular interest. This session sets the stage for the International Waters Web Developers' Workshop by clarifying participants' and their supervisors' expectations for how Web site development fits into their projects' overall strategy and business processes. A general characterization target audience and assessment of their needs is also discussed.

Objectives:

- To identify aims of each IW project participating in this workshop.
- To determine primary target audience and their likely interests in the Web site
- To characterize the content and functionality that each participant expects to incorporate into their project's Web site to meet these aims and interests
- To associate this Web content and functionality with project aims and visitor interests

Reference:

IW Web Developers' Workshop Archives

<http://www.groups.yahoo.com/group/iwlearn-workshop>

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Characterize the state of technical capacities among IW projects

This session draws upon the prior technical survey among workshop participants to generate an understanding of each project's technical capacity to develop and host their own websites. From this information, each participant will be able to determine how to increase or modify their project's technical capacity to achieve desired website functions as well as learning from other projects addressing similar challenges.

Additionally, emphasis will be placed on an assessment of end user technical requirements in order to design Web sites that best match end user technical capacity (*i.e.*, connection speed, monitor size, browser type).

Objectives:

- Learn the state of technical capacity among participating projects
- Gather additional information from additional participants on project's implementation of news, electronic forums, Geographic Information Systems and Distance Learning tools
- Discuss the correlation between server hardware/software components and enduser functionality
- Discuss how best to fill gaps in functionality with specific technical solutions based on each project's capacity
- Assess target audience to ensure that Web sites conform to their technical capacity

References:

iwlearn-workshop forum: <http://www.yahogroups.com/iwlearn-workshop>

IW:LEARN User Technology Survey Form

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Best Practices and Tools for Effective Web Site Design

Overview:

Web sites are first and foremost tools for communication. Thus, an effective Web site needs to communicate its priority message(s) and features clearly and prominently for visitors to discover. The site also needs to be usable for novices and experts alike, without distracting, confusing or frustrating them. Furthermore, the site must be accessible to visitors, regardless of their Internet connectivity or even access to computers.

This session will bring participants through the processes of designing an effective Web page, usability and accessibility testing, and effective overall Web site design.

Objectives:

- Design a Web page which effectively incorporates key messages to visitors.
- Evaluate the usability and accessibility of an International Waters Web site.
- Employ templates and site maps to consistently present effectively manage the organization of a Web site

References:

The Courseware Company. 2001. Dreamweaver – Creating a Basic Web Page [Free Distance Learning Tutorial]

<http://tutorials.beginners.co.uk/read/cobrand/beginners/i/310>

Bobby 3.2 [Free On-line Accessibility Software]

<http://www.cast.org/bobby/>

Macromedia Dreamweaver/UltraDev 4.0 [Web site development software]

<http://www.macromedia.com/software/ultradev/>

Nielson, J. Heuristic Evaluation [Usability Document]

http://www.useit.com/papers/heuristic/heuristic_evaluation.html

W3C. 1999. Web Content Accessibility Guidelines 1.0 [Accessibility Document]

<http://www.w3.org/TR/WAI-WEBCONTENT/>

Web Site Design and Management [Free Distance Learning Course]

<http://www.barnesandnobleuniversity.com/BaseServlet/containSched;jsessionId=aagflw8zkoUeH?schedulingId=50752>

Ten Usability Heuristics

1. Match Between System and the Real World

The system should speak the users' language, with words, phrases, and concepts familiar to the user, rather than system-oriented terms. Follow real-world conventions, making information appear in a natural and logical order.

2. Aesthetic and Minimalist Design

Dialogues should not contain information which is irrelevant or rarely needed. Every extra unit of information in a dialogue competes with the relevant units of information and diminishes their relative visibility.

3. Recognition Rather Than Recall

Make objects, actions, and options visible. The user should not have to remember information from one part of the dialogue to another. Instructions for use of the system should be visible or easily retrievable whenever appropriate.

4. Consistency and Standards

Users should not have to wonder whether different words, situations, or actions mean the same thing. Follow platform conventions.

5. Visibility of System Status

The system should always keep users informed about what is going on, through appropriate feedback within reasonable time.

6. User Control and Freedom

Users often choose system functions by mistake and will need a clearly marked "emergency exit" to leave the unwanted state without having to go through an extended dialogue. Support undo and redo.

7. Help Users Recognize, Diagnose, and Recover From Errors

Error messages should be expressed in plain language (no codes), precisely indicate the problem, and constructively suggest a solution.

8. Error Prevention

Even better than good error messages is a careful design which prevents a problem from occurring in the first place.

9. Help and Documentation

Even though it is better if the system can be used without documentation, it may be necessary to provide help and documentation. Any such information should be easy to search, focused on the user's task, list concrete steps to be carried out, and not too large.

10. Flexibility and Efficiency of Use

Accelerators—unseen by the novice user—may often speed up the interaction for the expert user such that the system can cater to both inexperienced and experienced users. Allow users to tailor frequent actions.

W3C Web Content Accessibility Guidelines 1.0

[Section 2 Accessible Design](#)

The guidelines address two general themes: ensuring graceful transformation, and making content understandable and navigable.

2.1 Ensuring Graceful Transformation

By following these guidelines, content developers can create pages that transform gracefully. Pages that transform gracefully remain accessible despite any of the constraints described in the [introduction](#), including physical, sensory, and cognitive disabilities, work constraints, and technological barriers. Here are some keys to designing pages that transform gracefully:

- Separate structure from presentation (refer to the difference between [content, structure, and presentation](#)).
- Provide text (including [text equivalents](#)). Text can be rendered in ways that are available to almost all browsing devices and accessible to almost all users.
- Create documents that work even if the user cannot see and/or hear. Provide information that serves the same purpose or function as audio or video in ways suited to alternate sensory channels as well. This does not mean creating a prerecorded audio version of an entire site to make it accessible to users who are blind. Users who are blind can use [screen reader](#) technology to render all text information in a page.
- Create documents that do not rely on one type of hardware. Pages should be usable by people without mice, with small screens, low resolution screens, black and white screens, no screens, with only voice or text output, etc.

The theme of graceful transformation is addressed primarily by guidelines 1 to 11.

2.2 Making Content Understandable and Navigable

Content developers should make content understandable and navigable. This includes not only making the language clear and simple, but also providing understandable mechanisms for navigating within and between pages. Providing navigation tools and orientation information in pages will maximize accessibility and usability. Not all users can make use of visual clues such as image maps, proportional scroll bars, side-by-side frames, or graphics that guide sighted users of graphical desktop browsers. Users also lose contextual information when they can only view a portion of a page, either because they are accessing the page one word at a time (speech synthesis or [braille display](#)), or one section at a time (small display, or a magnified display). Without orientation information, users may not be able to understand very large tables, lists, menus, etc.

The theme of making content understandable and navigable is addressed primarily in guidelines 12 to 14.

Section 6. Web Content Accessibility Guidelines

***Guideline 1. Provide equivalent alternatives to auditory and visual content.**

Provide content that, when presented to the user, conveys essentially the same function or purpose as auditory or visual content.

***Guideline 2. Don't rely on color alone.**

Ensure that text and graphics are understandable when viewed without color.

Guideline 3. Use markup and style sheets and do so properly.

Mark up documents with the proper structural elements. Control presentation with style sheets rather than with presentation elements and attributes.

***Guideline 4. Clarify natural language usage**

Use markup that facilitates pronunciation or interpretation of abbreviated or foreign text.

***Guideline 5. Create tables that transform gracefully.**

Ensure that tables have necessary markup to be transformed by accessible browsers and other user agents.

***Guideline 6. Ensure that pages featuring new technologies transform gracefully.**

Ensure that pages are accessible even when newer technologies are not supported or are turned off.

***Guideline 7. Ensure user control of time-sensitive content changes.**

Ensure that moving, blinking, scrolling, or auto-updating objects or pages may be paused or stopped.

Guideline 8. Ensure direct accessibility of embedded user interfaces.

Ensure that the user interface follows principles of accessible design: device-independent access to functionality, keyboard operability, self-voicing, etc.

***Guideline 9. Design for device-independence.**

Use features that enable activation of page elements via a variety of input devices.

Guideline 10. Use interim solutions.

Use interim accessibility solutions so that assistive technologies and older browsers will operate correctly.

***Guideline 11. Use W3C technologies and guidelines.**

Use W3C technologies (according to specification) and follow accessibility guidelines. Where it is not possible to use a W3C technology, or doing so results in material that does not transform gracefully, provide an alternative version of the content that is accessible.

***Guideline 12. Provide context and orientation information.**

Provide context and orientation information to help users understand complex pages or elements.

Guideline 13. Provide clear navigation mechanisms.

Provide clear and consistent navigation mechanisms -- orientation information, navigation bars, a site map, etc. -- to increase the likelihood that a person will find what they are looking for at a site.

***Guideline 14. Ensure that documents are clear and simple.**

Ensure that documents are clear and simple so they may be more easily understood.

* Includes a priority 1 action, important to review in advance of Web site development.

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Examine mechanisms for delivering news, newsfeeds, and newsletters via the Internet

This session introduces the common mechanisms for adding news content to a website, both statically and dynamically via automatically generated news from various sources.

During this session, participants will identify how their respective project's generate news and the frequency with which they disseminate news. Additionally, participants will learn the various mechanisms available to incorporate news headlines into their websites. Through this process, participants will also become familiar with the elements of a quality newsletter and the various options for disseminating that product to the general public.

Objectives:

- Generate news via three common methods:
 - Static HTML
 - Dynamic HTML via syndicated news services
 - Dynamic HTML via automated news retrieval from own sources
- Identify the basic elements of a quality newsletter
- Evaluate appropriate methods for newsletter dissemination
 - Email only
 - Documents via email
 - Documents online

References:

Static news sites:

<http://www.pemsea.org>

<http://www.caspianenvironment.org/>

Dynamic newsfeeds from syndicated news services:

<http://www.iwlearn.org/test/> - center column

<http://www.geo-know.net/> - right-hand column

More information on this free service is available from <http://www.moreover.com>

A sample JavaScript implementation of this newsfeed is available from

<http://www.iwlearn.net/Global/iwl/workshop/newsfeed.htm>

[view source of file to see where to edit/change the news being searched]

Dynamic newsfeeds from IW content sources using Rich Site Summary [RSS] files:

RSS file generator – <http://www.webreference.com/cgi-bin/perl/rssedit.pl>

This script allows a novice to enter news headline and information without having to know RSS code.

For more information on RSS and perl scripts to implement news syndication system, see

<http://www.webtechniques.com/archives/2000/02/eisenzopf/>

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Evaluate Tools, Methods And Indicators For Effective Electronic IW Forums

Appropriate information technology (IT) tools and interpersonal process skills form the basis for an effective electronic forum. In this session, participants will become familiar with various inexpensive software solutions for hosting electronic discussions or forums via push (“email”) and pull (“bulletin-board”) approaches. Appropriateness of each approach (or a hybrid of both) will be discussed. Then, we will turn our attention to what makes an given electronic forum effective, including focus, facilitation team, participants roles and involvement, moderation, and stages and duration of the on-line dialog process.

Objectives:

- Review how IW projects have used electronic forums
- Examine and compare potential tools for your project to implement electronic forums
- Identify some preconditions, players, roles, and stages for effective electronic forums

References:

Discussion Tools

Discus/Discus Pro

<http://www.discusware.com/pro/>

Jive 2

<http://www.jivesoftware.com/>

YahooGroups

<http://www.yahogroups.com/>

WebCrossing

<http://www.webcrossing.com/>

Process Skills Examples and Training

The International Waters Forum.

<http://www.groups.yahoo.com/iw-forum/messages>

GEF-IW-LAC.

<http://www.groups.yahoo.com/iw-forum/messages>

Itrain. 2000. Training Materials - List Facilitation

<http://www.bellanet.org/itrain/materials.cfm>

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Creating online documentation systems for effective discovery

During this session, participants will become familiar with simple steps to make their project documentation easier to use, store and disseminate on-line. Additionally, participants will learn basic methods for creating a documentation system that can be searched both on-line and off-line via CD-ROM.

Objectives:

- Convey the how's and why's for using Adobe Acrobat (.pdf) and Microsoft Word (.doc) documents as the base for your documentation
- Code document names logically for ease of retrieval
- Search documents in offline and online modes
- Create a simple document quasi-database on the web

References:

Adobe Acrobat <http://www.adobe.com/products/acrobat/main.html>

Adobe Acrobat Reader (see Web Toolkit CD)

Document quasi database example <http://www.ltbp.org/PDD.HTM>

Search engine software <http://www.htdig.org/>

PDF and .DOC/.RTF parsers for search engine <http://www.htdig.org/FAQ.html>

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Identify the most appropriate database and search engine alternatives for serving IW projects' knowledge products and information resources.

Overview:

Behind the simple one-box search engine on many Web sites and portals may lie any of a variety of search engine technologies of various merit. Some search engines will only return text (.txt) or hypertext (.html) documents, while others discover Acrobat files (.pdf), Microsoft office documents (.doc, .xls, etc.) or even multimedia resources (*e.g.*, audio or video recordings, personal contact information, courses, or software tools). Some engines search only one Web site, others will return results from many locations. Thus selecting an appropriate search engine to run behind your Web site's search box is crucial for your visitors to discover the information you provide.

Full-text indexing and metadata approaches will be demonstrated and discussed in detail.

Objectives:

- Demonstrate how a simple search can discover .pdf, .rtf and .doc documents
- Examine how an advanced ("fielded") searches can retrieve a variety of information resources
- Discuss:
 - What makes a good search engine
 - What are the components on a search engine
 - What are the documentation prerequisites for an advanced search engine?

References:

Examples of Simple Full-text Indexed Search Engines

IW:LEARN - <http://www.iwlearn.net>

Free full-text search engine software:

Ht://Dig - <http://www.htdig.org>

MnoGo - <http://www.mnogosearch.com>

PDF and .DOC/.RTF parsers for search engine <http://www.htdig.org/FAQ.html>

Examples of Advanced Metadata-based Search Engines

FGDC. ---. Search for Geographic Data. <http://130.11.52.184/>

United States. Library of Congress Online Catalog

<http://catalog.loc.gov/>

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Apply Metadata Standards to the Development of On-line Documentation Systems and Advanced Search Engines

Overview:

Metadata – also known as “data about data” or “documentation” – are records whose fields describe particular information resources. For example, the fields “Author,” “Title” and “Date” are some possible fields in a metadata record to describe published materials. Such bibliographic metadata is well known in libraries’ electronic catalogs, such as at the United States Library of Congress. Other metadata fields are used to describe Web resources (e.g., “Creator,” “URL”), people (“Name,” “Phone Number,” “Address”) and other resources. This session examines how widely accepted metadata standards make it easier to search and retrieve appropriate information via the Internet. Specific examination of several metadata standards provides a framework for designing searchable metadata databases for individual Web sites as well as for distributed Web-based communities.

Objectives:

- To identify how metadata helps improve the quality and accuracy of Web-based searches
- To examine several popular standards for metadata
- To test the utility of a multi-standard metadata database for encoding documentation, and discovering and sharing information resources via the World-Wide Web and related electronic media (e.g., CD-ROM).

References:

FGDC. 2001. Metadata. <http://www.fgdc.gov/metadata/metadata.html>

IW:LEARN. 2001. Multi-Schema Metadata Guidelines. (enclosed)



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Multi-Schema Metadata Guidelines

Metadata is structured documentation about information or knowledge resources. Each metadata record includes fields such as “Title,” “Subject,” etc. There are different metadata standards for various purposes and communities (e.g., news wires, bibliographic information, contact information). When multiple Web servers or clients use the same metadata standards or “schema,” then they can communicate to share their documentation and resources.

IW:LEARN is developing guidelines for a multi-schema metadata format to help the International Waters community share a variety of resources (Internet files, contact information, project information, on-line courses, maps, etc.) across servers in various regions around the world.

Current Schema Included in IW:LEARN Metadata Structure

1. Dublin Core: Web-based resources
(<http://www.dublincore.org/documents/1999/07/02/dces>)
2. vCard: Personal or organizational contact information (<http://www.imc.org/pdi/vcard-21.txt> for v2.1 or <ftp://ftp.isi.edu/in-notes/rfc2426.txt> for v3.0)
3. International Development Markup Language (IDML): International development projects and activities (currently in pre-release version)
(<http://www.bellanet.org/idml/resources/dtds/ACFC7.doc>)
4. SCORM: On-line training, courses and curricula
(http://www.imsproject.org/metadata/imsmdv1p2/imsmd_infov1p2.html)

Both map-related metadata (ISO schema) and news-related (RDF) metadata are also likely candidates for inclusion in IW:LEARN’s evolving metadata structure. Furthermore, IW:LEARN will be providing specifications and models to help partners to develop relational and/or object-oriented databases to hold and share metadata which are compliant with these global standards.

Using Multi-Schema Approach to Search Across Resource Types

IW:LEARN is currently seeking partners in developing countries to collaborate in the establishment of IW:LEARN-compatible metadata databases and the population of such with content relevant to the International Waters community. To participate in this initiative, please contact IW:LEARN using the information below

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Discuss roles for Geographic Information Systems on IW Websites.

In this round-table session, participants will discuss how their projects are implementing or plan to implement GIS systems. Emphasis will be placed on possibilities for broadening access to such geospatial databases through the Internet using the GEF Secretariat's Web site as an example. Potential plans to increase its utility through collaboration with IW projects will also be discussed.

Objectives:

- Discuss IW project's use of GIS for mapping and to effectively make such GIS information accessible to end users via the Internet
- Recognize by example how to implement a Internet mapping solution to existing and future GIS databases.

References:

ESRI ArcIMS (Internet Mapping Server)

<http://www.esri.com/software/arcims/index.html>

ForNet Map Server (free open source alternative to ArcIMS)

<http://mapserver.gis.umn.edu/>

GEF Project Mapping and Tracking System

<http://edcnts2.cr.usgs.gov/gef/>

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Exploring Usability of Various Distance Learning Tools for IW Web Sites

Overview:

Distance learning (DL) describes any educational process whereby the instructor and the student are not physically situated in the same place at the same time. This guided exploration of several Web-based distance learning will help participants to evaluate the usability and usefulness of various “hosted” and “do-it-yourself” DL approaches.

Objectives:

- To examine the breadth of distance learning solutions across hosted and do-it-yourself approaches
- To consider the most usable and appropriate solution for IW distance learning.

References:

Hosted DL

- Prometheus.com
<http://www.prometheus.com/demo>
- Blackboard.com – example: San Diego Waterways
<http://www.blackboard.com/courses/18410/>
- Ucompass.com
<http://www.ucompass.com/mar2001/demotrial.html>

Do-It-Yourself DL Examples

- USEPA Watershed Academy 2000 [Powerpoint]
<http://www.epa.gov/watertrain>
- IW:LEARN-RHUL Distance Masters Course Module in International Waters [Multi-media]
<http://www.cedarweb.rhul.ac.uk/waters.html> then
<http://www.cedarweb.rhbnc.ac.uk/Opts/IWL1>
- University of Maryland University College – On-line Programs [Lotus Domino-based WebTycho software]
<http://www.umuc.edu/distance>

Do-It-Yourself DL Tools

- Macromedia Enterprise Learning Systems [DL development software]
http://www.firmware.com.au/products/Macromedia/learning_systems.cfm
- WebCT [DL development software]
<http://www.webct.com>
- About.com index of DL tools
<http://distancelearn.about.com/msubsystems.htm>

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Develop personal plan to implement lessons from this workshop, with 30 day milestone

As participants of this workshop, you have learned a lot of skills and tools that will help to address your organization's mission and assist in reaching your target audience.

This session helps to identify what you can do over the next 60 days to demonstrate the skills you have learned here and helps you to provide substantive benefits to your project.

Objectives:

- Identify one feasible project/tool which you could implement using the skills and knowledge gained from this workshop to meet your project's goals
- Lay out an 8 week plan to implement the project with one 30-day milestone and a second 'final product' (by end of the year) to share with other participants from the workshop
- Collaborate with other participants in the development of these tools by means of the iwlearn-workshop electronic list.