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## Why Develop Web-Based Health Information Workshops for Consumers?

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### ABSTRACT

Developing Web-based consumer health information workshops can be a great way to promote the value of library services and encourage the use of high-quality health information by consumers. This article begins with a practical discussion of the desirability of developing Web-based consumer health information training by libraries. In order to develop effective and usable Web-based training, using good instructional design principles is paramount. Ongoing evaluation and maintenance of Web-based training is also important. The article describes in detail the application of good instructional design in developing Web-based training for health care consumers, creating usable Web-based training, and the ongoing evaluation and maintenance of Web-based training. The article concludes with an overview of basic usability and accessibility principles for Web-based instructional materials.

Developing consumer health information workshops can be a great way to promote the value of library services. Health care consumers will learn to view the library providing access to high-quality consumer health information instruction as the source of considerable assistance in gathering the information they need to make good health decisions. Such instruction furthers the mission of libraries to encourage the use of high-quality health information by consumers. Identifying and evaluating health information is a complex process. Libraries can make that process more transparent for the health care consumers they serve.

Web-based instruction involves the offering of instruction in the form

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of tutorials, courses, workshops, or pathfinders through the library's Web site. Web-based instruction is desirable for several reasons. The ubiquity of Web access means that many health care consumers who may not visit the physical library will be able to make use of the Web-based instruction. Web browsers provide a mostly uniform user interface. Web-based instruction is desirable because consumers can work through the Web from any place and at any time that they have Web access. This means they can access and use such instruction at the point in time when they actually need the instruction; they have the access immediately after they have received a diagnosis from a health care professional or at the point in time they need to make a decision about contacting a health care professional.

### SOME EXAMPLES OF WEB-BASED INSTRUCTION FOR HEALTH CARE CONSUMERS

HealthInfoQuest: Pathfinders to Common Consumer Health Questions was designed by the National Network of Libraries of Medicine (n.d.) as a tutorial and pathfinder tool for librarians to use in answering consumer health reference questions.



Pathfinders are a time-honored tradition in public libraries. HEALTHINFOQUEST pathfinders are designed for public librarians and health information specialists.

Explore the HEALTHINFOQUEST Site Map and read through the following sections to streamline your experience:

- [Navigating HEALTHINFOQUEST](#)
- [Enhancing Your Experience](#)
- [Other Uses](#)

Each HEALTHINFOQUEST pathfinder stands alone and demonstrates ways to answer sample questions using authoritative and reliable resources. Health information novices might want to start with the Terminology pathfinder.



The [Pathfinder Index](#) contains a complete listing of all categories and sample questions.



The [Site Map](#) is the site's Table of Contents and contains sample reference interviews and more.



[Site Help](#) contains tips to enhance understanding and navigation of this site.

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 NNLM Web Developer | Revised: April 9, 2003  
<http://nmlm.gov/healthinfoquest/>

Funded by 

The State University of New York, Upstate Medical University, Health Sciences Library (n.d.) has created "How to Find Reliable Health Information on the Internet," which provides the basics of both searching and evaluating health information on the Web. MedlinePlus: Interactive Health Tutorials is a project of the National Library of Medicine (n.d.). It is a growing collection of tutorials for consumers on multiple medical topics, including medical procedures, diseases, injuries, and other issues.

Skip navigation



**MedlinePlus**  
Trusted Health Information for You

A service of the U.S. NATIONAL LIBRARY OF MEDICINE  
and the NATIONAL INSTITUTES OF HEALTH

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### Interactive Health Tutorials

The tutorials listed below are interactive health education resources from the [Patient Education Institute](#). Using animated graphics each tutorial explains a procedure or condition in easy-to-read language. You can also listen to the tutorial.

**NOTE:** These tutorials require a special Flash plug-in, version 4 or above. If you do not have Flash, you will be prompted to obtain a free download of the software before you start the tutorial.

#### • Diseases and Conditions

- Abdominal Aortic Aneurysm
- Acne
- Allergies to House Dust Mites
- Alopecia
- Amyotrophic Lateral Sclerosis (ALS)
- Angina
- Anthrax
- Asthma
- Arrhythmias
- Arthritis
- Atrial Fibrillation
- Back Pain
- Brain Cancer
- Bell's Palsy
- Breast Cancer
- Burns
- Cataracts
- Cerebral Palsy
- Chronic Obstructive Pulmonary Disease (COPD)
- Colon Cancer
- Congestive Heart Failure
- Crohn's Disease
- Cubital Tunnel
- Cystic Fibrosis
- Depression
- Diabetes
- Diabetes - Eye Complications
- Diabetes - Foot Care
- Diabetes - Meal Planning
- Divertercolitis
- Endometriosis
- Epstein Barr and Mononucleosis
- Erectile Dysfunction - Viagra
- Fractures and Sprains
- Gallion Cysts
- Fibromyalgia
- Gastroesophageal Reflux Disease (GERD)
- Glaucoma
- Gout
- Hearing Loss
- Heart Attack
- Hepatitis C
- Hypertension (High Blood Pressure)
- Hypocholesterolemia
- Incontinence

#### • Tests and Diagnostic Procedures

- Barium Enema
- Bone Densitometry
- Breast Lump - Biopsy
- Colonoscopy
- Colposcopy
- Coronary Angiography and Angioplasty
- CT Scan (CAT Scan)
- Cystoscopy
- Diagnostic Laparoscopy
- Echocardiogram
- Echocardiography Stress Test
- Intravenous Pyelogram (IVP)
- Knee Arthroscopy
- Mammogram
- MRI
- Myelogram
- Nuclear Scan
- Pap Smear
- Shoulder Arthroscopy
- Sigmoidoscopy
- Ultrasound

#### • Surgery and Treatment Procedures

- Aortobifemoral Bypass
- Arterial Lines, Central Lines, and Bladder Catheter
- Breast Cancer - Surgery
- Cardiac Rehabilitation
- Carotid Endarterectomy
- Carpal Tunnel Syndrome (Open Surgery)
- Chemotherapy
- Cholecystectomy (Gallbladder Removal Surgery)
- Clinical Trials
- Colon Cancer - Surgery
- Colostomy
- Coronary Artery Bypass Graft
- Craniotomy for Aneurysms
- Dilation and Curettage (D & C)
- Epidural Anesthesia
- General Anesthesia
- Heart Valve Replacement
- Hemorrhoid Surgery
- Hip Replacement
- Hip Replacement - Physical Therapy

## WHAT IS WEB-BASED INSTRUCTION?

Web-based teaching can be as simple as publishing the equivalent of pathfinders or paper guides on Web pages for people to read. Instructors can add interactivity through forms or communication through a variety of options: email, Web boards, Web chat, etc. The more interactivity you have, the more time on the part of both instructors and learners is required. However, research and experience shows that learners will be more successful and more likely to complete Web-based workshops with at least a minimal amount of high-quality communications with an instructor.

The main elements of Web-based instruction are

1. The core tool: Web pages with instructional content.
2. Communications tools: On a stand-alone Web site, the content and design of the site provide one-way communication from teacher to learner (this may include multimedia options).
  - a. Asynchronous (delayed time) communication: Forms and email links within Web pages provide learner to teacher(s) communications; direct interpersonal email between learner(s) and teacher(s); discussion lists and newsgroups for learner(s) to learner(s) as well as teacher(s) to learner(s) communications; Web boards/Web forums for learner(s) to learner(s) as well as teacher(s) to learner(s) communications.
  - b. Synchronous (virtually real-time message delivery or visibility): Web chat (or Web conferencing, instant messaging).
3. Multimedia support materials: Audio/video, for example, Flash movies, streaming audio or video software/applets (such as calculators).

The instructional content of Web-based instruction is obviously the most important piece. Instructional content should be firmly based in both subject knowledge and good instructional design.

Web-based instructional materials can be used as self-paced tutorials without re-creating the traditional classroom environment online. However, many instructors prefer to have some aspects of that classroom environment integrated into their Web-based instruction.

There are Web-based or Web interfaced communications tools that help instructors to re-create certain aspects of the classroom environment. The most important aspect of any classroom is communication. The instructor may simply stand at the front of a room and lecture or he may lead discussions and arrange the class so that learners do some presentation and sharing of information. There are three kinds of communication that take place in the classroom environment, whether it is online or in person: teacher to learner(s), learner(s) to learner(s), and learner(s) to teacher. Asynchronous tools such as discussion lists, newsgroups, and Web board and forum tools of various types provide instructional communication mechanisms that allow delayed-time exchange of messages. There is no need to schedule a specific time for learners and instructors to meet.

Learners must have a commitment to either checking their email or logging into the newsgroup server or Web bulletin board software on a regular basis to read messages. However, they can do that at a time and place of their own choosing. Synchronous or virtually real-time communications tools require that the instructor schedule a specific time for meeting online. These tools are “virtually” real-time because there is in fact a slight delay in the transmission of messages between computers, but the delay is similar to that experienced during long-distance telephone calls. Some of the synchronous tools allow more creativity in re-creating the classroom environment online. Tools such as that used by the University of Illinois at Urbana–Champaign Graduate School of Library and Information Science (n.d.) LEEP program, for example, provide facilities for Web page projection, virtual classroom construction, classroom discipline commands (for example, hand raising, instructor permission to speak, etc.), whiteboard services, discussion transcript tools, and more. Other synchronous communications tools such as America Online’s (AOL) Instant Messenger or ICQ (I Seek You) are simpler.

Multimedia support materials such as sound or video files may be used through Web pages to deliver lectures. The lecture may also be written in text or HTML format for learners to read as well as listen and/or view. The MedlinePlus: Interactive Health Tutorials (National Library of Medicine, n.d.) use sound and video files to support the written lectures. It is also possible to use software that allows virtually real-time audio and video communications between learners and instructors (for example, RealPlayer). However, this technology requires that the learners have high-speed computers, digital video cameras, and other hardware available to them. Most successful Web-based instruction makes use of multimedia tools as a supplement to the instruction rather than as an integral part of the instruction.

The Web also enhances instruction by making it possible for learners to use software programs or applets from the instructional Web pages, for example the Nutrition Analysis Tools and System (NATS) made available by the Department of Food Science and Human Nutrition at the University of Illinois at Urbana–Champaign (n.d.).

This same functionality allows the use of Web-based testing and quizzing programs. There are many issues involved in online testing, including the most important one of all: How do you ensure that the person taking the test is the person who is supposed to be taking it? However, using online quizzes to reinforce learning—rather than evaluating learners—is a viable option. The How to Find Reliable Health Information on the Internet site (State University of New York, n.d.) uses quizzes effectively to reinforce content learning and to assess the learner’s readiness to begin learning to use the Web-based tutorial.

Effective and usable Web-based instruction has to be designed in such

a way that consumers can learn from the content and be interactive in ways that reinforce that learning.

## INSTRUCTIONAL DESIGN OF WEB-BASED CONSUMER HEALTH WORKSHOPS

There are literally as many instructional design plans, methods, or strategies as there are teachers, instructors, and trainers—designing instruction. Instructional design is implicit in most teaching—even when instructors teach “off the top of their heads” as it were. In Web-based instruction we cannot teach “off the top of our heads.” Everything we teach must be converted to a Web-deliverable format. Formal instructional design is analogous to how computer programmers work. New programmers begin by using flowcharts to guide the coding of their algorithms. As programmers become more facile with their work they frequently omit the creation of formal flowcharts. In the Web-based instruction environment, a formal instructional design process is necessary.

Basically, good instructional design involves

1. Determining the instructional needs of your learner group
2. Discovering the learning characteristics and entry behaviors of your learners. Are they librarians, library paraprofessionals, college learners, members of the general public? What is their educational level? What do they already know?
3. Deciding on the goals of your instruction and whether they are measurable
4. Analyzing the instruction; define step-by-step what is to be taught
5. Deciding what the performance objectives will be or what learners will have to do to show that they have met the goals of the instruction
6. Deciding on an instructional strategy. How will you motivate learners to learn? How will the topic be taught? How will concepts or skills be presented? In what order and with what instructional materials? How will you test learners to establish that they have met the performance objectives?
7. Evaluating the learner’s success based on performance objectives
8. Evaluating the instruction success based on the criteria established by the instructional needs of your learner group

To keep the process as simple as possible, seven key steps were derived from my actual practice and a synthesis of instructional design models from published sources (see Recommended Readings on Instructional Design in the references below), as well as an M.Ed program in instructional technology. Instructional design can be much more complicated and include other factors that the instructor or designer think are important. These seven steps are the factors that I consider to be essential for good Web-based teaching design:

1. Needs Assessment/Instructional Goals
2. Instructional Analysis
3. Entry Behavior and Learner Characteristics
4. Performance Objectives
5. Instructional Strategy, which includes pre-instructional activities, information presentation, learner participation, testing, and follow-through activities
6. Developing Instructional Materials
7. Formative Evaluation

The Needs Assessment/Instructional Goals step must always be the first step because it may also be the last. This is the point in instructional design where it will be decided if instruction is actually required or if instruction is already available from a different source. What objective purpose does teaching a particular learner or group of learners serve?

The first part of needs assessment and instructional goals development is to try to either learn or deduce the learners' characteristics. Ideally a pre-test or other formal mechanism is used, but more frequently it is necessary to assume or have expectations about learners.

It is essential to identify the potential learners. When developing instruction for "consumers," it will be a challenge to define exactly who is meant by the concept of "health care consumer." What group characteristics are shared by health care consumers? One reason that development of instruction by local libraries is valuable is that at that level they may have a clearer idea of who their "consumers" are. The concept of who the potential learners are includes their educational status, language skills, and occupational status. Each library will define the "consumers" based on their own data or experience.

What do the potential learners need to know and why? Another way of asking this is: Who is the workshop for? What kind of time and interest do they have in the topic? What is their need for information on this topic? Is it important or critical in some way that instruction be provided? Depending on the answers to these questions the instruction may not be necessary or it may be found to be of critical importance. These questions concern the specific skills and content knowledge that the learners either need or want. The best way to find out is to ask them and to observe how they succeed or fail at activities that require specific skills and content knowledge.

The amount of time that learners have available to them is a factor frequently overlooked by Web-based instructional designers. Health care consumers may have a lot of time to sit and learn, but it is more likely that they have a few minutes between other life obligations to spend looking for the information they need. Knowing this, all aspects of Web-based instruction must respect the limited amount of time the learner has available.

Once the learners and the knowledge and skills the learners need to

acquire have been identified, the next step is to decide how, where, and from what sources instruction will be provided. What kinds of materials that could provide the instruction exist already? For example, given the existence of the MedlinePlus: Interactive Health Tutorials, it may be the best choice to provide a link to that site rather than developing completely new instruction on those topics.

If it is decided that instruction should be developed locally, it will be necessary to select the best person to create and deliver the instruction. For Web-based instruction, a content specialist is important, as well as someone who can create Web pages. A team approach might be productive.

Before any kind of instruction is developed, before any Web pages are constructed, it will be useful to formulate an instructional goals statement. This is the overall statement describing what it is that the instruction will accomplish or do for the learner. This is not a statement of what the learner will be able to do after the instruction. That is called "performance objectives" and is discussed below. Here is an example instructional goals statement: "Learners will develop awareness of the scope of health information resources available on the Internet, learn the basic skills for accessing those resources, and develop strategies for evaluating health information resources."

Brainstorm with or survey learners and other individuals who are concerned with the instruction to make sure the instructional goals statement is clear and realistic. Obtain a consensus on the instructional goals statement before proceeding. Share the goals with the learner(s) and other interested people to get their feedback; alter the goal, then re-review with them until all agree that this is what is wanted. McCray et al. (2000) describe in detail the process of consensus building on the content and design of a consumer health Web site.

The extent to which the goals of the instruction have been achieved should be measurable in some way. For example, attainment of the goals mentioned earlier could be measured by querying the learner or observing the learner's success or failure at a later time in finding high-quality health information on the Web.

The Instructional Analysis step is where the development of instruction begins, based firmly in the needs assessment results. Instructional analysis involves defining step-by-step what is involved in teaching specific skills and concepts. Diagramming can be useful; start with general concepts and branch off into more specific concepts before finally turning to actual activities involved.

For example, below is a step-by-step guide for teaching someone to search the MedLine Plus Web site:

1. Learner characteristics assumed: Have Web access and know how to use a Web browser.
2. Use a Web browser to connect to <http://www.medlineplus.gov>.

3. Demonstrate, observe, or describe the layout of the main page.
4. Locate the search box.
5. Locate the topic areas/information products.
6. Demonstrate or otherwise convey information about the content of each topic area/information product.
7. Demonstrate or otherwise convey information about what is searched by the search box and how searches are formulated.
8. Choose a topic area/information product or type in a search . . . and so on.

This is the instructional design step that is most critical for designing Web-based instructional navigation flow and the overall organization of the Web site.

The Entry Behavior and Learner Characteristics step involves determining required or expected characteristics for actual learners, not just the general expected group characteristics used in the Needs Assessment/Instructional Goals. This issue can be more critical online than offline. It is here that planning for the Web-based instruction accessibility and usability by learners is necessary. The best strategy is to plan to make the site as accessible as possible, with minimal technology requirements and minimal skills and knowledge required from the learner. This is also the step where instructions for how to access and engage in the Web-based instruction are developed. For example, *How to Find Reliable Health Information on the Internet* (State University of New York, n.d.) begins with a screen describing the technology requirements and how to proceed with the tutorial.

Performance Objectives are the skills and knowledge that learners are expected to actually perform or otherwise demonstrate as a result of the instruction. For example, the learner will be able to locate the information for a drug they are taking by using the MedlinePlus "Drug Information" product. The learner could demonstrate this by

- Completing a search while the instructor observes.
- Completing a search and then writing an essay describing what they learned and how they will use it.

This is the instructional design step where content is compiled and chosen and plans are made for interactions between the instructional content, the instructor, and the learner.

The Instructional Strategy step is where actual production of instructional materials should begin. Pre-instructional activities such as promotion and marketing of the instruction should be considered. How will the learners be motivated to engage in the instruction? Examples of motivation techniques include:

- Require them to learn for their job security
- Reward them with higher pay

- Reward them with long-term rewards such as good grades or job advancements
- Reward them with the joy of learning and or successful acquisition of high-quality information

Plan for information presentation using the instructional analysis to decide the order in which you will teach particular skills, concepts, etc.

What kinds of learner participation in the instruction will be required or optional? What will learners do during the teaching? For example, learners might

1. Listen to (or read) lectures
2. Read supporting books/articles/lectures
3. Practice performing skills
4. Be given instructor feedback

In Web-based instruction, plan for communications through forms or email links on the Web site or links to other communications tools (email, Web chat, Web forums, etc.).

Testing is concerned with how learner's success at attaining the performance objectives will be evaluated. How will learners be evaluated? How will the success or failure of the goals and objectives of the teaching be measured? Will you give tests or quizzes, papers or essays or projects? How will those be evaluated or graded? What will the rubric for evaluation be?

Finally, plan for follow-through activities. How will you know after the instruction is completed if it had an impact on the learner? How will you verify that the learning that took place is used on the job or transferable to future learning situations? Observation of subsequent learner behavior is one option, as are surveys or querying the learner's employer; in the case of health care consumers, health care professionals might be queried.

Developing Instructional Materials is the second to last step. Basically, this is when the Web pages and supporting media are created. What materials will you develop? The site should contain pages with

- Information about structure and navigation of the instructional materials
- Lecture/narrative content
- Activities/exercises
- Web-based communications mechanisms
- Multimedia files

Web-based instruction might be supplemented by developing supportive instructional materials in other formats such as printed workbooks, videos, audio recordings, etc., that can be sent to learners.

Formative Evaluation is the assessment of the success or failure of the teaching overall. The success or failure of the instruction itself is evalu-

ated—not the evaluation of the learner. Formative evaluations involve the following questions:

1. Did the learners achieve the goals and objectives as described?
2. Should the teaching be repeated with new learners?
3. Was the instructor effective?
4. Were the instructional materials effective?
5. Did the workshop meet the time and information needs of those for whom it was designed?
6. How was it revised?
7. What were the challenges in keeping the workshop current?
8. What kinds of technical or time management problems arose during delivery?

Web forms for evaluation of the workshop by the learners or other interested persons are a good Web-based instruction element. For an example, see *Kovacs Consulting* (n.d.). Florida Gulf Coast University's excellent "Principles of Online Design" Program (Florida Gulf Coast University, n.d.) provides a clear and very detailed overview of instructional design for Web-based instruction as well.

### DESIGNING USABLE AND ACCESSIBLE WEB-BASED INSTRUCTION

In order to successfully deliver well-designed instructional content through Web pages, the instructor will need to understand the basic elements of good Web page design as well. Simply stated these are

1. Make accessibility a priority: Use the World Wide Web Consortium's (W3C) Web Accessibility Initiative (WAI) Web Content Accessibility Guidelines (W3C, n.d. b) and the HTML validation service (W3C, n.d. a) to ensure that your Web page is standard and accessible. To evaluate the accessibility of your Web page, use the *WAVE 3.0 Accessibility Tool* (n.d.).
2. Provide high-quality content: Keep content focused on the instructional goals.
3. Write information clearly and concisely in simple language.
4. Keep navigation clear and simple: Always make it clear to the learner where they are at in the instructional sequence.
5. Never trap the learner: Allow them to exit and move forward and backward.
6. Keep the design elements interesting but focused on the instruction (for example, keep graphics pertinent and minimal—information graphics as opposed to decorative graphics).
7. Provide feedback so the learners know how they are doing on interactive activities.

## CONCLUSION

Developing effective, usable, and accessible Web-based instruction requires careful design and thoughtful construction. High-quality content that is appropriate for the audience is paramount. Developing Web-based instruction requires commitment of staff time and resources that will be repaid by increasing the value of the library to the health care consumers they serve.

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