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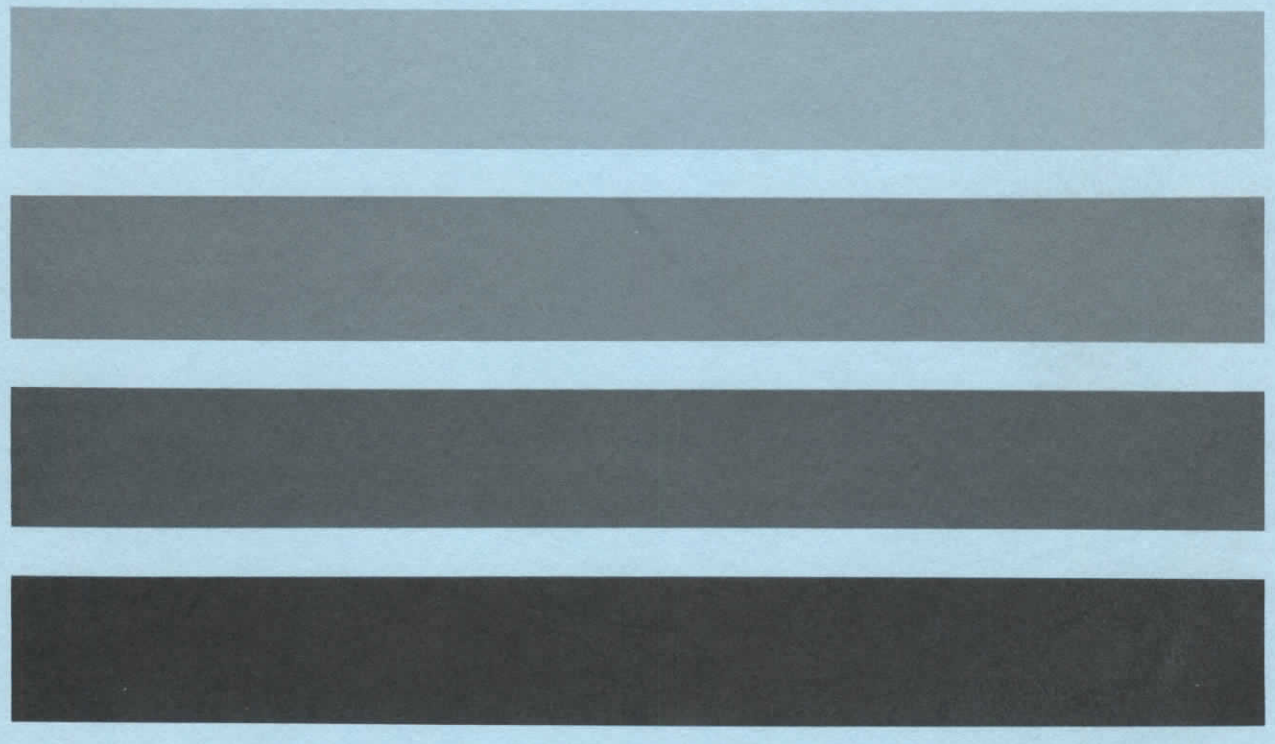

Presentation Summaries

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Introduction to the Internet

Charles V. Homan, Jr., HealthCare Visions, Inc.

The Internet. What is it, where is it, how do you use it? It seems that every day the hype for the nebulous linking of computers we call "the net" grows exponentially. Is the hype merited? Can using the Internet really make you more productive. Well, the media hype may be a bit over the top, but you can definitely be wildly more productive with every aspect of your business through utilization of the Internet's resources.

History

(Taken from thesis of Henry Edward Hardy; http://www.ocean.ic.net/ftp/doc/nethist.html, seraphim@umcc.umich.edu.) The history of the Net begins in the 1960s with the establishment of the packet-switched networks. Packet-switching is a method of fragmenting messages into sub-parts called packets, routing them to their destinations, and reassembling them. Packetizing information has several advantages. It facilitates allowing several users to share the same connection by breaking up the data into discrete units which can be routed separately. Because no transmission medium is 100% reliable, packet-switching allows one "bad" packet to be re-sent while other "good" packets are uninterrupted in their transmission.

Perhaps the first packet-switching network operated at the National Physical Laboratories in the UK beginning in 1968. Another early packet-switching experiment conducted by the Societe Internationale de Telecommunications Aeronautiques in 1968-1970. Development of a packet-switched network began in the US in 1968, but it was not until 1969 that this technology was delivered to the US Defense Department's Advanced Research Projects Agency (ARPA). The ARPANET used NCP, Network Control Protocol as its transmission protocol from 1969 to 1982, when NCP was replaced with the now-widespread TCP/IP.

An "Internet" is a connected set of networks, such as those using Transmission Control Protocol (TCP) and Internet Protocol (IP). When used in conjunction, this suite of protocols is referred to as TCP/IP. "The Internet" usually refers to the connected TCP/IP Internets. Networks based on other systems, such as OSI might also be considered Internets and part of the Internet. Often this definition is expanded to include all the other networks which have connections to the Internet, such as BITNET, Janet and Usenet.

Terminology

To understanding a culture, you must know the language. The Internet does indeed have a culture of it's own and it's own language. A good net resource for learning the definitions to words like FTP, HTTP, HTML and the like can be found at http://www.whatis.com. Just about any word associated with computers and the Internet can be found at this site.

To be functional on the Internet, there are a few words that you must be familiar with:

HTTP (Hypertext Transport Protocol). The hypertext transfer protocol (HTTP) is the set of rules for exchanging files (text, graphic images, sound, video, and other multimedia files) on the World Wide Web. Relative to the TCP/IP suite of protocols (which are the basis for information exchange on the Internet), HTTP is an application protocol. Essential concepts that are part of HTTP include (as its name implies) the idea that files can contain references to other files whose selection will elicit additional transfer requests. Any Web server contains, in addition to the Web files it can serve, an HTTP daemon, a program that is designed to wait for HTTP requests and handle them when they arrive. Your Web browser is an HTTP client, sending requests to servers. When the browser user enters file requests by either "opening" a Web file (typing in a Uniform Resource Locator or URL) or clicking on a hypertext link, the browser builds an HTTP request and sends it to the Internet Protocol address indicated by the URL. The World Wide Web Consortium provides details of the current HTTP rules.

HTML (Hypertext Markup Language). HTML is the set of "markup" symbols or codes inserted in a file intended for display on a Web browser. The markup tells the Web browser how to display the information for the user. HTML is defined both by a standards committee and by proprietary extenders of the language such as Netscape and Microsoft. Currently, the latest official version of HTML is HTML 3.2. There are a number of helpful books on HTML. We like Laura *Lemay's Teach Yourself Web*

Publishing with HTML 3.2 in a Week (Sams.net Publishing) and Ian Graham's *HTML Sourcebook* (John Wiley). However, it's possible to learn HTML from material available on the Web itself. These sources include:

- NCSA's HTML Primer (http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html)
- The Barebones Guide to HTML (http://www.werbach.com/barebones/)
- Ian Graham's Introduction to HTML (http://www.utoronto.ca/webdocs/HTMLdocs/NewHTML/htmlindex.html)

The World Wide Consortium's Web site includes an authoritative version of the HTML 3.2 Reference Specification. The W3C also describes the next HTML enhancements that are being developed. There are a number of tools available to help you create HTML files (Web pages). Among the most popular editors are *Brooklyn North's HTML Assistant Pro* (which this file was created with), Hotdog, and HotMetal. A new class of tool lets you create pages without having to be directly concerned with the HTML tags. These include Adobe's Pagemill and Microsoft's FrontPage.

FTP (File Transfer Protocol). FTP (File Transfer Protocol) is the usual way you send files to your server (or receive some). Using FTP, you can also update (delete, rename, move, and copy) files at a server. People who create Web home pages use FTP to get their files to the server where they will be accessed. FTP is one of the suite of protocols that are part of TCP/IP, the client/server program that every Internet server and your (client) PC or workstation uses. FTP has a user command interface for establishing contact with a server, logging in, and sending, receiving, or otherwise changing files. Or you may install a utility that offers a graphical interface. Many access providers include an FTP utility as part of the set-up. Among FTP utilities that can be downloaded from the Web are WS_FTP, CuteFTP (http://www.cuteftp.com) and FTP Explorer (http://www.winsite.com). At whatis.com, we've recently installed WS_FTP and find it to be easy and fast to use.

WWW (World Wide Web). A technical definition of the World Wide Web is: all the resources and users on the Internet that are using the Hypertext Transport Protocol (HTTP). A broader definition comes from the organization that Web inventor Tim Berners-Lee helped found, the World Wide Web Consortium (W3C): "The World Wide Web is the universe of network-accessible information, an embodiment of human knowledge."

USENET. USENET is a worldwide network of posted discussion groups known as newsgroups and a set of rules for accessing and posting to them. There are thousands of newsgroups. A newsgroup can be hosted on servers that are outside the Internet and many are. Usenet's original protocol was UNIX-to-UNIX Copy (UUCP), but other protocols are more prevalent today. Most browsers, such as Netscape and Microsoft's Internet Explorer, provide USENET support and access to any newsgroups that you select.

E-MAIL (electronic mail). E-mail (electronic mail) is the exchange of computer-stored messages by telecommunication. Messages are encoded in ASCII text. However, you can also send non-text files, such as graphic images and sound files, as attachments sent in binary streams. E-mail was one of the first uses of the Internet and is still the most popular single use. A large percentage of the total traffic over the Internet is e-mail. E-mail can also be exchanged between online service users and in networks other than the Internet, both public and private. E-mail can be distributed to lists of people as well as to individuals. A shared distribution list can be managed by using an e-mail reflector. Some mailing lists allow you to subscribe by sending a request to the mailing list administrator. A mailing list that is administered automatically is called a list server. SMTP (Simple Mail Transfer Protocol) is a popular e-mail server program that your access provider may have installed (and for which your browser probably includes a client program). To receive mail that has been collected for you by your access provider, a frequently installed server is POP3. Among the more popular e-mail programs are Qualcomm Communications' Eudora and Connectsoft's E-Mail Connection, a shareware program.

JAVA. Java is a programming language expressly designed for use in the distributed environment of the Internet. It was designed to have the "look and feel" of the C++ language, but it is simpler to use than C++ and enforces a completely object-oriented view of programming. Java can be used to create complete applications that may run on a single computer or be distributed among servers and clients in a network. It can also be used to build small application modules or applets for use as part of a Web page. Applets make it possible for a Web page user to interact with the page. The major characteristics of Java are:

- The programs you create are portable in a network. Your program is compiled into Java bytecode that can be run on any server or client in a network that has a Java Virtual Machine. The Java Virtual Machine interprets the bytecode into code that will run on the real computer hardware. This means that individual computer platform differences such as instruction lengths can be recognized and accommodated locally without requiring different versions of your program.
- The code is "robust," meaning that, unlike programs written in C++ and perhaps some other languages, the Java objects have no outside references that may cause them to "crash."
- Java was designed to be secure, meaning that its code contains no pointers outside itself that could lead to damage to the operating system. The Java interpreter at each operating system makes a number of checks on each object to ensure integrity.
- Java is object-oriented, which means that, among other characteristics, similar objects can take advantage of being part of the same class and inherit common code. Objects are thought of as "nouns" that a user might relate to rather than the traditional procedural "verbs." A method can be thought of as one of the object's capabilities.
- In addition to being executed at the client rather than the server, a Java applet has other characteristics designed to make it run fast.
- Relative to C++, Java is easier to learn. (However, it is not a language you'll pick up in an evening!)
- Java was introduced by Sun Microsystems in 1995 and instantly created a new sense of the interactive possibilities of the Web. Since then, almost all major operating system developers (IBM, Microsoft, and others) have added Java compilers as part of their operating system products.
- JavaScript should not be confused with Java. JavaScript is interpreted at a higher level, is easier to learn than Java, but lacks some of the portability of Java and the speed of bytecode. Because Java applets will run on almost any operating system without requiring recompilation and because Java has no operating system-unique extensions or variations, Java is generally regarded as the most strategic language in which to develop applications for the Web.

FRAMES. In creating a Web site, frames is the use of multiple, independently controllable sections on a Web page. This effect is achieved by building each section as a separate HTML file and having one "master" HTML file identify all of the sections. When a user requests a Web page that uses frames, the address requested is actually that of the "master" file that defines the frames; the result of the request is that multiple HTML files are returned, one for each visual section. Since each frame is actually an HTML file, links in one frame can request another file that will appear in another (or the same) frame. A typical use of frames is to have one frame containing a selection menu in one frame and another frame that contains the space where the selected (linked to) files will appear. Frames are defined with HTML FRAMESET and FRAME tags that are one of the Netscape extensions to HTML 3.0. Sites that use frames need to create an alternative scheme of pages for requests from browsers that don't support them. A good example of frames in practice is the Total Baseball site (http://www.totalbaseball.com) or (possibly) the frames version of this site. Netscape provides an introduction to frames. The best tutorial we've found is at http://www.newbie.net/frames/.

COOKIE. A cookie is a way for a place you visit on the World Wide Web site to remember that you've visited the site and possibly to retain some information about you. The Web's protocol (the Hypertext Transport Protocol or HTTP) has no way itself of remembering previous requests. That is, only one request from a browser at a time can be "remembered" and responded to by the server. Once the request has been satisfied, the Web server (using the HTTP protocol) has no record of it when the next request from that browser is received. Since it is often desirable to maintain continuity in a series of requests and responses, a cookie is information that the server (actually a CGI application at the server) puts in the HTTP header that accompanies its response to a browser request. The browser can then store this information and send it back in any additional requests related to the whole transaction or series of requests and responses. For additional information, see the Netscape preliminary specification for a cookie.

SEARCH ENGINE. As the term is generally used, a search engine has two parts: 1) A "robot" or "crawler" that goes to every page or representative pages on the Web and creates a huge index; 2) A

program that receives your search request, compares it to the entries in the index, and returns results to you

(All definitions taken from http://www.whatis.com)

Browsers

A browser is a program that provides a way to look at, read, and even hear all the information on the World Wide Web. The word "browser" seems to have originated prior to the Web as a generic term for user interfaces that let you browse text files online. By the time the first Web browser with a graphical user interface was invented (it was called Mosaic), the term seemed to apply to Web content, too. Technically, a Web browser is a client program that uses the Hypertext Transport Control Protocol (HTTP) to make requests of Web servers throughout the Internet on behalf of the browser user. Currently, the most popular browser is Netscape Navigator. Microsoft's Internet Explorer is gaining usage as Windows 95 installations grow. A commercial version of the original browser, Mosaic, is still widely used. Other browsers include the browsers for the online services, America Online, CompuServe, and Prodigy, but these are beginning to offer Netscape or Internet Explorer in addition to or as a replacement for their own. Lynx is a text-only browser for UNIX shell and VMS users.

iWorld, an electronic newspaper on the Web, provides a great deal of information about browsers and their usage on their BrowserWatch pages (http://www.whatis.com).

Browsers are quickly incorporating more advanced features for users than simply viewing html. Netscape and Microsoft now offer packages that allow workgroups to collaborate, videoconference and file transfer. E-mail clients, newsgroup readers, calendars, terminal hosts, and other add-ins ship with these popular browsers as well. Microsoft has integrated it's Internet Explorer into is desktop applications making the line between operating system and Internet Browser more blurred. This is the genesis of a trend that will continue.

E-Mail

E-mail is perhaps the single most productivity booster associated with the Internet. E-mail allows fast, documentable, effective, convenient, and efficient communication across your organization and the world. The power of e-mail is the technology's ability to broadcast messages to groups at a time. A single message can be sent to thousands instantly. Also, listservs, or majordomos, can enable groups of people with similar interest to exchange information without having to have individual email addresses.

Newsgroups

Newsgroups are similar to listservs in that they are a clearing houses that allow people with interest to post messages for others. The difference is that messages are stored on a news server, not mailed to individual e-mail accounts. To access messages, you log onto a news server and choose from one of the thousands of newsgroups listed. There is a newsgroup for just about any interest group. If you can't find one for your topic. You can create one!

Conclusion

Through this introduction, you should have a general knowledge of the capabilities of the Internet. So is it hype, or is it fact? Can you make your organization more productive by using the Internet? It depends on how you use the technology that is available.

How to Design and Run a Resource Center

Mary Longe, President, Longe Life Libraries

A consumer resource center, if planned well, can be an effective platform for ensuring the use of health information via computers and other media. This session provides a solid understanding of what is possible and what it takes to develop, implement and maintain a resource center. It addresses the nitty gritty start-up and maintenance considerations in the operations of a resource center. It describes strategies to effectively mix educational interventions, such as print, tapes, counseling, software, CD-ROM, Internet access etc, to provide consumers with the best information and the organization with the best outcomes. It offers a successful framework for the integration of health information as health care shifts to managed care and outcome management.

I. A successful resource center must reflect the organization.
- A. Mission
- B. Organizational Strategies and Organizational Business Objectives
  1. Financial
  2. Marketing
  3. Operational
  4. Others

II. To be successful, measurable objectives for the resource center should be set.
- A. Patient Care Outcomes
- B. Managed Care Ready
- C. Financial
- D. Marketing
- E. Spirituality
- F. Health Enhancement
- G. Others

III. A management strategy and service mix for the resource center must be established.
- A. Information dissemination formats
  1. Technology
  2. Print and audio visual
  3. Online
  4. Virtual
  5. Kiosks
- B. Screenings and service feeders
- C. Educational options
- D. Support groups
- E. Web page
- F. Book store and other revenue sources
- G. Case management
- H. Outcomes measurement/evaluation

IV. Service requirements must be determined. Requirements might include factors such as, integrated, attractive, easy access, low cost, quality information.

V. A service strategy must also be determined.
- A. Marketing
- B. Operations
- C. Tracking requirements

VI. Financial requirements, cost and budget are essential to success.

VII. A financial strategy will make or break a resource center.
- A. Efficiencies
- B. Contributions and grants
- C. Contracts
- D. Marketing

Champagne Medical Multimedia on a Beer Budget

Allan Platt, PA-C, and Patricia Myler, Grady Health System

Introduction. Teaching patients and professionals medical concepts is an ongoing challenge. Written material does not allow visual and auditory stimulation. Different levels of comprehension may pose a problem with written materials. It is widely accepted that the more the participant interacts with the learning material, and the more visually it is presented, that retention is increased. Computers and multimedia software allow teachers to present complex concepts with visual animation, sound and interactivity with the recipient. The learning material can be narrated for different audiences. Computers are now widely accepted in the medical setting, and in the home. Medical education programs can be distributed by CD-ROM, or over the Internet for inexpensive distribution.

The cost of hiring a consultant to design and program a title can be prohibitive. Using existing presentation software for under $250, and computer equipment for under $2000, one cane develop and distribute professional looking interactive teaching programs. The learning curve for this software is short and development time even shorter. The author can spend most of their time on content and design instead of programming. With in house design and programming, full control over change, updating, and improving the program may occur with little or no expense.

Equipment

Computers. Excellent multimedia capable computers can be purchased for under $2,000 in today's market. One should maximize the systems RAM to 16 MB or greater and require a hard disk size of 1 Gigabyte or greater. The system should have audio (recording and playback) capability and a CD-ROM drive. Also, recommended is a color printer ($200 - $400), a Zip Drive for 100 MB of image file storage and back up capability ($150), and a fast modem for Internet connectivity ($100 - $200). Also, you now can record your own CD-ROMs with record-once drives ($500). The next decision point is between a larger desktop computer or a portable. Presentations become mobile with a portable, and maintain all of the multimedia features. The portable now has CD-ROM and sound capability for $2,000 -$3,000, depending on the other features purchased.

Projection. There are multiple ways to project your multimedia presentation from the no-cost, "gather around the computer screen", to high end LCD projectors. The least expensive method is a VGA to TV converter ($100 -$150) connected to a large screen TV. An LCD overhead panel ($2,000) that sits on top of a very bright overhead projector (3000+ Lumens for $300) is midrange for cost. The LCD projectors offer the best quality, but at the greatest expense ($4,000 - $6,000).

Still and Motion Images. Images can be obtained by using medical clip art, color scanners ($200 - $2,000) or video cameras and a Snappy image capture device ($190). The Snappy fits on the computer's parallel printer port and, through its software , can capture any image from any standard video source. High resolution images can be obtained using video cameras such as the Cannon Vizcam. There are many video capture boards that can be installed into desktop computers, however, the price paid is the storage and manipulation of digital video. Only a few seconds of video will occupy several megabytes of hard -disk storage. If you need to incorporate video sequences in your presentation, you may want to have a professional company digitize and compress the clips you want. The software we will discuss can display video clips.

Software

Authoring software is for multimedia programmers and is usually in the $500 - $1,000 range. These are more complex programs such as *Multimedia Toolbook* by **Asymetrix**, *Authorware* and *Director* by **Macromedia**, These programs offer greater flexibility in programming, but a much steeper learning curve. We will present the do-it-yourself category of presentation software. These programs all cost under $250 and require little programming knowledge. The selection includes **Microsoft** *PowerPoint*, **Asymetrix** *Compel*, **Astound Software's** *Astound*, and **Corel's** *Click and Create*. The products presented were selected because of low cost and ease of use. All of these programs allow the use of pictures, animation, audio, and video. All of these programs have a run time or method of freely distributing your teaching program. All of these programs can output to slides, handouts and computer screens. These products require that the user be familiar with the windows environment, *either Window*

3.x or *Windows 95*. The user should be familiar with different graphic and audio formats. Only *Click and Create* requires *Windows 95*.

Distribution. One must decide how to distribute the completed teaching product to the end user. All of these programs will allow packaging to diskettes, and CD-ROM, but not all will allow for interactive use on the World Wide Web. *Power Point* and *Astound* offer Web capability, but not *Compel or Click and Create*. The Web is an excellent method of inexpensively distributing your material to a world wide audience across many computer platforms.

PowerPoint by Microsoft - Price $100. Contact www.Microsoft.com

- Benefits:
  - Ease of use and general acceptance
  - Large group of installed users
  - Imports Word outlines into instant slides
  - Can download free web adapter from Microsoft
- Limitations:
  - Limited PowerPoint viewer that will not allow links to other slide shows
  - Limited navigation within slides
  - No hypertext

Compel 2.0 by Asymetrix - Price $99, Contact www.Asymetrix.com or 800/448-6543.

- Benefits:
  - Comes bundled with program called 3DFX and Digital Video Producer
  - Allows buttons and interactivity hypertext and hyperlinking
  - Built in animator
  - Good hypertext and navigation to other slides and presentations
- Limitations:
  - Must develop hyperlinks on the same drive letter as the one you plan to install to.
  - Not transportable to higher end TOOLBOOK software or to direct Web
  - No time line
  - Not fully supported or marketed.

Astound 4.0 by Astound Software - Price $99. Contact Astoundinc.com or 800/982-9888.

- Benefits: Full interactivity
  - Transportable to the Web
  - Can import Power Point slides
  - Works with Win 3.x and Win 95
- Limitations: Minimal limitations

Click and Create by Corel - Price $230 as Upgrade. Contact: www.Corel.com or 800/772-6735.

- Benefits: Full interactivity
  - Game design capability
- Limitations: Not transportable to the Web
  - Windows 95 required
  - Cost

How to Layout Your Program

Outline your topic using a word processor. List the pictures and animation you need. Select your background and navigation tools. Import, cut and paste your materials into the presentation and use one page or slide per concept. Arrange your final order and link pages and hypertext. Now you are ready to distribute.

Design and Development of CAI

Linda Caputi, EdD, MSN, College of DuPage
Jane Kirkpatrick, MSN, RNC, Purdue University

The Development Team

Subject Matter Expert (SME)
- -defines need, target audience, learning objectives
- -responsible for content accuracy
- -selects the information to be included
- -arranges the content in the order it should be presented
- -suggests appropriate graphics
- -interfaces closely with Instructional Designer re: type of instruction
- -reviews materials at all stages of production

Graphic Artist
- -produces graphics as requested
- -develop color scheme
- -designs animations, prepares visuals
- -may design support materials such as users/instructors guide
- -may assist in marketing materials such as brochures, program packaging

Instructional Designer
- -designs the screen layout template
- -designs information screens to engage learners (in collaboration with SME)
- -sequences the instruction to meet objectives
- -plans the movement through the instruction (branching, storyboarding)
- -consults with the programmer to ensure design is possible with the authoring system
- -reviews materials at all stages of development

Computer Programmer
- -transforms materials provided by the Instructional Designer into a software program
- -produces a bug-free program
- -works closely with the Instructional Designer during development

Project Manager
- -schedules and conducts team meetings throughout project
- -facilitates work of team
- -maintains timelines
- -keeps the project within the budget allotted
- -coordinates the work of team members
- -acts as problem-solver and resource for other team members
- -reviews materials at all stages of production

Marketing
- -Marketing agent
- -Direct mail
- -Exhibit at professional conferences
- -Conference presentations
- -Home page on the World Wide Web

Stages of the Development Process

Analyze the situation
- -Learners
- -Goals/Objectives
- -Develop Content
- -Theme

Design the Instruction
- -Content
- -Plan for flexibility
- -Determine strategies for learning, reinforcement, motivation

-Design screens
introductory
menu
directions
instructional (where the content is presented)
practice (reinforcement)
tests
conclusion
-Color and Graphics
consistency/cues
animation
graphics

Program the Instruction
-Select an authoring tool
-Assure you have the right hardware
-Produce the graphics
-Program the screens

Conduct a Formative Evaluation
-Peers
-Students
-Trial run
-Modify as needed

Conduct a Summative Evaluation
-Formal Methods
-Analyze data
-Draw conclusions
-Plan for Future Projects

Theoretical Constructs to Guide the Design of CAI

Behavioral Psychology
-chunk into small segments
-frequent practice activities
-immediate feedback
-positive reinforcement
-keep learners informed of progress/success

Cognitive Psychology
-make the instruction as interactive as possible
-require active participation of the learner
-give learner control over the session
-design instruction to be as close as possible to the application setting
-relationship among concepts are emphasized
-individualized learning
-build new experiences based on old ones
-use simulations to help the learner experience the new role

Adult Learning Theory: based on characteristics of adult learners
-adults want to participate in the learning process
-adults bring a wide variety of life experiences
-adults are independent, self-reliant learners
-adults focus on dealing with problems they encounter in life situations
-adults are value-driven

Factors Needing Consideration When Developing CAI

Need
Time
Cost
Marketing your product
-publisher
-through your own business

HTML Programming Basics

Charles V. Homan, Jr., HealthCare Visions, Inc.

Whether you are interested in creating a full blown corporate web site for your organization, or if you simply want to put your family on the net for you brother in Cleveland to see, you must know a bit of HTML. Today, through the introduction of HTML Authoring programs you do not need to know much of the HTML language. We will review a few of these authoring programs. In order to explain the meat and potatoes of HTML we will create a web site, as well as upload our very own web site. The following tutorial is adapted from the NCSA's Beginners Guide to HTML available at http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimerAll.html

HTML

HyperText Markup Language--HTML is, in practical terms, a collection of platform-independent styles (indicated by markup tags) that define the various components of a World Wide Web document. HTML was invented by Tim Berners-Lee while at CERN, the European Laboratory for Particle Physics in Geneva.

What Isn't Covered. This tutorial assumes that you: 1) know how to use NCSA Mosaic or some other Web browser; 2) have a general understanding of how Web servers and client browsers work; and 3) have access to a Web server (or that you want to produce HTML documents for personal use in local-viewing mode)

HTML Version. This guide reflects the most current specification--HTML Version 2.0-- plus some additional features that have been widely and consistently implemented in browsers. Future versions and new features for HTML are under development.

HTML Documents. HTML documents are plain-text (also known as ASCII) files that can be created using any text editor (e.g., Emacs or vi on UNIX machines; BBEdit on a Macintosh; Notepad on a Windows machine). You can also use word-processing software if you remember to save your document as "text only with line breaks."

HTML Editors. Some WYSIWYG editors are available (e.g., HotMetal, which is available for several platforms or Adobe PageMill for Macintoshes). You may wish to try one of them after you learn some of the basics of HTML tagging. It is useful to know enough HTML to code a document before you determine the usefulness of a WYSIWYG editor.

If you haven't already selected your software, refer to an online listing of HTML editors (organized by platform) to help you in your search for appropriate software.

Tags Explained

An element is a fundamental component of the structure of a text document. Some examples of elements are heads, tables, paragraphs, and lists. Think of it this way: you use HTML tags to mark the elements of a file for your browser. Elements can contain plain text, other elements, or both. To denote the various elements in an HTML document, you use tags. HTML tags consist of a left angle bracket (<), a tag name, and a right angle bracket (>). Tags are usually paired (e.g., <H1> and </H1>) to start and end the tag instruction. The end tag looks just like the start tag except a slash (/) precedes the text within the brackets. HTML tags are listed below.

Some elements may include an attribute, which is additional information that is included inside the start tag. For example, you can specify the alignment of images (top, middle, or bottom) by including the appropriate attribute with the image source HTML code. Tags that have optional attributes are noted below. NOTE: HTML is not case sensitive. <title> is equivalent to <TITLE> or <TiTIE>. There are a few exceptions noted in Escape Sequences below. Not all tags are supported by all World Wide Web browsers. If a browser does not support a tag, it (usually) just ignores it.

The Minimal HTML Document. Every HTML document should contain certain standard HTML tags. Each document consists of head and body text. The head contains the title, and the body contains the actual text that is made up of paragraphs, lists, and other elements. Browsers expect specific information because they are programmed according to HTML and SGML specifications.

Required elements are shown in this sample bare-bones document:

```
<html>
<head>
<TITLE>A Simple HTML Example</TITLE>
</head>
<body>
<H1>HTML is Easy To Learn</H1>
<P>Welcome to the world of HTML.
This is the first paragraph.  While short it is
still a paragraph!</P>
<P>And this is the second paragraph.</P>
</body>
</html>
```

The required elements are the <html>, <head>, <title>, and <body> tags (and their corresponding end tags). Because you should include these tags in each file, you might want to create a template file with them. (Some browsers will format your HTML file correctly even if these tags are not included. But some browsers won't! So make sure to include them.)

Click to see the formatted version of the example. A longer example is also available but you should read through the rest of the guide before you take a look. This longer-example file contains tags explained in the next section.

A Teaching Tool

To see a copy of the file that your browser reads to generate the information in your current window, select View Source (or the equivalent) from the browser menu. The file contents, with all the HTML tags, are displayed in a new window. This is an excellent way to see how HTML is used and to learn tips and constructs. Of course, the HTML might not be technically correct. Once you become familiar with HTML and check the many online and hard-copy references on the subject, you will learn to distinguish between "good" and "bad" HTML. Remember that you can save a source file with the HTML codes and use it as a template for one of your Web pages or modify the format to suit your purposes.

Markup Tags

HTML. This element tells your browser that the file contains HTML-coded information. The file extension .html also indicates this an HTML document and must be used. (If you are restricted to 8.3 filenames (e.g., LeeHome.htm, use only .htm for your extension.)

HEAD. The head element identifies the first part of your HTML-coded document that contains the title. The title is shown as part of your browser's window (see below).

TITLE. The title element contains your document title and identifies its content in a global context. The title is displayed somewhere on the browser window (usually at the top), but not within the text area. The title is also what is displayed on someone's hotlist or bookmark list, so choose something descriptive, unique, and relatively short. A title is also used during a WAIS search of a server. For example, you might include a shortened title of a book along with the chapter contents: NCSA Mosaic Guide (Windows): Installation. This tells the software name, the platform, and the chapter contents, which is more useful than simply calling the document Installation. Generally you should keep your titles to 64 characters or fewer.

BODY. The second--and largest--part of your HTML document is the body, which contains the content of your document (displayed within the text area of your browser window). The tags explained below are used within the body of your HTML document.

HEADINGS. HTML has six levels of headings, numbered 1 through 6, with 1 being the most prominent. Headings are displayed in larger and/or bolder fonts than normal body text. The first heading in each document should be tagged <H1>. The syntax of the heading element is:

<Hy>Text of heading </Hy>

where y is a number between 1 and 6 specifying the level of the heading. Do not skip levels of headings in your document. For example, don't start with a level-one heading (<H1>) and then next use a level-three (<H3>) heading.

PARAGRAPHS. Unlike documents in most word processors, carriage returns in HTML files aren't significant. So you don't have to worry about how long your lines of text are (better to have them fewer than 72 characters long though). Word wrapping can occur at any point in your source file, and multiple spaces are collapsed into a single space by your browser. In the bare-bones example shown in the Minimal HTML Document section, the first paragraph is coded as

```
<P>Welcome to the world of HTML.
 This is the first paragraph.
 While short it is still a  paragraph!</P>
```

In the source file there is a line break between the sentences. A Web browser ignores this line break and starts a new paragraph only when it encounters another <P> tag. Important: You must indicate paragraphs with <P> elements. A browser ignores any indentations or blank lines in the source text. Without <P> elements, the document becomes one large paragraph. (One exception is text tagged as "preformatted," which is explained below.) For example, the following would produce identical output as the first bare-bones HTML example:

```
<H1>Level-one heading</H1>
<P>Welcome to the world of HTML. This is the
first paragraph. While short it is still a
paragraph! </P> <P>And this is the second paragraph.</P>
```

To preserve readability in HTML files, put headings on separate lines, use a blank line or two where it helps identify the start of a new section, and separate paragraphs with blank lines (in addition to the <P> tags). These extra spaces will help you when you edit your files (but your browser will ignore the extra spaces because it has its own set of rules on spacing that do not depend on the spaces you put in your source file).

NOTE: The </P> closing tag can be omitted. This is because browsers understand that when they encounter a <P> tag, it implies that there is an end to the previous paragraph. Using the <P> and </P> as a paragraph container means that you can center a paragraph by including the ALIGN=alignment attribute in your source file.

```
<P ALIGN=CENTER>
This is a centered paragraph.
[See the formatted version below.]
</P>
```

This is a centered paragraph.

Lists

HTML supports unnumbered, numbered, and definition lists. You can nest lists too, but use this feature sparingly because too many nested items can get difficult to follow.

Unnumbered Lists. To make an unnumbered, bulleted list, 1) start with an opening list <UL> (for unnumbered list) tag; 2) enter the <LI> (list item) tag followed by the individual item; no closing </LI> tag is needed; 3) end the entire list with a closing list </UL> tag. Below is a sample three-item list:

```
<UL>
<LI> apples
<LI> bananas
<LI> grapefruit
</UL>
```

The output is:

- apples
- bananas
- grapefruit

Numbered Lists. A numbered list (also called an ordered list, from which the tag name derives) is identical to an unnumbered list, except it uses <OL> instead of <UL>. The items are tagged using the same <LI> tag. The following HTML code:

```
<OL>
<LI> oranges
```

```
<LI> peaches
<LI> grapes
</OL>
```

produces this formatted output:

1.oranges
2.peaches
3.grapes

Preformatted Text. Use the <PRE> tag (which stands for "preformatted") to generate text in a fixed-width font. This tag also makes spaces, new lines, and tabs significant (multiple spaces are displayed as multiple spaces, and lines break in the same locations as in the source HTML file). This is useful for program listings, among other things. The <PRE> tag can be used with an optional WIDTH attribute that specifies the maximum number of characters for a line. WIDTH also signals your browser to choose an appropriate font and indentation for the text. Hyperlinks can be used within <PRE> sections. You should avoid using other HTML tags within <PRE> sections, however. Note that because <, >, and & have special meanings in HTML, you must use their escape sequences (<, >, and &, respectively) to enter these characters. See the section Escape Sequences for more information.

Forced Line Breaks/Postal Addresses. The
 tag forces a line break with no extra (white) space between lines. Using <P> elements for short lines of text such as postal addresses results in unwanted additional white space. For example, with
:

```
National Center for Supercomputing Applications<BR>
605 East Springfield Avenue<BR>
Champaign, Illinois 61820-5518<BR>
```

The output is:

National Center for Supercomputing Applications
605 East Springfield Avenue
Champaign, Illinois 61820-5518

Horizontal Rules. The <HR> tag produces a horizontal line the width of the browser window. A horizontal rule is useful to separate sections of your document. For example, many people add a rule at the end of their text and before the <address> information. You can vary a rule's size (thickness) and width (the percentage of the window covered by the rule). Experiment with the settings until you are satisfied with the presentation. For example:

```
<HR SIZE=4 WIDTH="50%">
```

displays as:

Character Formatting. HTML has two types of styles for individual words or sentences: logical and physical. Logical styles tag text according to its meaning, while physical styles indicate the specific appearance of a section. For example, in the preceding sentence, the words "logical styles" was tagged as a "definition." The same effect (formatting those words in italics) could have been achieved via a different tag that tells your browser to "put these words in italics." NOTE: Some browsers don't attach any style to the <DFN> tag, so you might not see the indicated phrases in the previous paragraph in italics.

Logical Versus Physical Styles. If physical and logical styles produce the same result on the screen, why are there both? In the ideal SGML universe, content is divorced from presentation. Thus SGML tags a level-one heading as a level-one heading, but does not specify that the level-one heading should be, for instance, 24-point bold Times centered. The advantage of this approach (it's similar in concept to style sheets in many word processors) is that if you decide to change level-one headings to be 20-point left-justified Helvetica, all you have to do is change the definition of the level-one heading in your Web browser. Indeed many browsers today let you define how you want the various HTML tags rendered on-screen.

Another advantage of logical tags is that they help enforce consistency in your documents. It's easier to tag something as <H1> than to remember that level-one headings are 24-point bold Times centered or

whatever. For example, consider the <STRONG> tag. Most browsers render it in bold text. However, it is possible that a reader would prefer that these sections be displayed in red instead. Logical styles offer this flexibility. Of course, if you want something to be displayed in italics (for example) and do not want a browser's setting to display it differently, use physical styles. Physical styles, therefore, offer consistency in that something you tag a certain way will always be displayed that way for readers of your document. Try to be consistent about which type of style you use. If you tag with physical styles, do so throughout a document. If you use logical styles, stick with them within a document. Keep in mind that future releases of HTML might not support physical styles, which could mean that browsers will not display physical style coding.

Physical Styles.

<B> = bold text
<I> = italic text
<TT> = typewriter text, e.g. fixed-width font.

Linking. The chief power of HTML comes from its ability to link text and/or an image to another document or section of a document. A browser highlights the identified text or image with color and/or underlines to indicate that it is a hypertext link (often shortened to hyperlink or link). HTML's single hypertext-related tag is <A>, which stands for anchor. To include an anchor in your document:

1) start the anchor with <A (include a space after the A)
2) specify the document you're linking to by entering the parameter HREF="filename" followed by a closing right angle bracket (>)
3) enter the text that will serve as the hypertext link in the current document
4) enter the ending anchor tag: </A> (no space is needed before the end anchor tag)

Here is a sample hypertext reference in a file called US.html:

```
<A HREF="MaineStats.html">Maine</A>
```

This entry makes the word Maine the hyperlink to the document MaineStats.html, which is in the same directory as the first document.

Relative Pathnames Versus Absolute Pathnames. You can link to documents in other directories by specifying the relative path from the current document to the linked document. For example, a link to a file NYStats.html located in the subdirectory AtlanticStates would be:

```
<A HREF="AtlanticStates/NYStats.html">New York</A>
```

These are called relative links because you are specifying the path to the linked file relative to the location of the current file. You can also use the absolute pathname (the complete URL) of the file, but relative links are more efficient in accessing a server. Pathnames use the standard UNIX syntax. The UNIX syntax for the parent directory (the directory that contains the current directory) is "..". (For more information consult a beginning UNIX reference text such as Learning the UNIX Operating System from O'Reilly and Associates, Inc.) If you were in the NYStats.html file and were referring to the original document US.html, your link would look like this:

```
<A HREF="../US.html">United States</A>
```

In general, you should use relative links because:

1) it's easier to move a group of documents to another location (because the relative path names will still be valid)
2) it's more efficient connecting to the server
3) there is less to type

However use absolute pathnames when linking to documents that are not directly related. For example, consider a group of documents that comprise a user manual. Links within this group should be relative links. Links to other documents (perhaps a reference to related software) should use full path names. This way if you move the user manual to a different directory, none of the links would have to be updated.

URLs. The World Wide Web uses Uniform Resource Locators (URLs) to specify the location of files on other servers. A URL includes the type of resource being accessed (e.g., Web, gopher, WAIS), the address of the server, and the location of the file. The syntax is:

scheme://host.domain [:port]/path/ filename

where scheme is one of
file = a file on your local system
ftp = a file on an anonymous FTP server
http = a file on a World Wide Web server
gopher = a file on a Gopher server
WAIS = a file on a WAIS server
news = a Usenet newsgroup
telnet = a connection to a Telnet-based service

The port number can generally be omitted. (That means unless someone tells you otherwise, leave it out.) For example, to include a link to this primer in your document, enter:

<A HREF="http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimer.html">
NCSA's Beginner's Guide to HTML</A>

This entry makes the text NCSA's Beginner's Guide to HTML a hyperlink to this document.

Links to Specific Sections. Anchors can also be used to move a reader to a particular section in a document (either the same or a different document) rather than to the top, which is the default. This type of an anchor is commonly called a named anchor because to create the links, you insert HTML names within the document. This guide is a good example of using named anchors in one document. The guide is constructed as one document to make printing easier. But as one (long) document, it can be time-consuming to move through when all you really want to know about is one bit of information about HTML. Internal hyperlinks are used to create a "table of contents" at the top of this document. These hyperlinks move you from one location in the document to another location in the same document. (Go to the top of this document and then click on the Links to Specific Sections hyperlink in the table of contents. You will wind up back here.) You can also link to a specific section in another document. That information is presented first because understanding that helps you understand linking within one document.

Links Between Sections of Different Documents. Suppose you want to set a link from document A (documentA.html) to a specific section in another document (MaineStats.html). Enter the HTML coding for a link to a named anchor:

documentA.html:

In addition to the many state parks, Maine is also home to
Acadia National Park.

Think of the characters after the hash (#) mark as a tab within the MaineStats.html file. This tab tells your browser what should be displayed at the top of the window when the link is activated. In other words, the first line in your browser window should be the Acadia National Park heading. Next, create the named anchor (in this example "ANP") in MaineStats.html:

<H2><A NAME="ANP">Acadia National Park</H2>

With both of these elements in place, you can bring a reader directly to the Acadia reference in MaineStats.html. NOTE: You cannot make links to specific sections within a different document unless either you have write permission to the coded source of that document or that document already contains in-document named anchors. For example, you could include named anchors to this primer in a document you are writing because there are named anchors in this guide (use View Source in your browser to see the coding). But if this document did not have named anchors, you could not make a link to a specific section because you cannot edit the original file on NCSA's server.

Links to Specific Sections within the Current Document. The technique is the same except the filename is omitted. For example, to link to the ANP anchor from within MaineStats, enter:

...More information about
<A HREF="#ANP">Acadia National Park
is available elsewhere in this document.

Be sure to include the <A NAME=> tag at the place in your document where you want the link to jump to (<H2><A NAME="ANP">Acadia National Park</H2>). Named anchors are particularly useful when you think readers will print a document in its entirety or when you have a lot of short information you want to place online in one file.

Mailto. You can make it easy for a reader to send electronic mail to a specific person or mail alias by including the mailto attribute in a hyperlink. The format is:

<A HREF="mailto:emailinfo@host">Name

For example, enter:

<A HREF="mailto:pubs@ncsa.uiuc.edu">
NCSA Publications Group

to create a mail window that is already configured to open a mail window for the NCSA Publications Group alias. (You, of course, will enter another mail address!)

Inline Images. Most Web browsers can display inline images (that is, images next to text) that are in X Bitmap (XBM), GIF, or JPEG format. Other image formats are being incorporated into Web browsers [e.g., the Portable Network Graphic (PNG) format]. Each image takes time to process and slows down the initial display of a document. Carefully select your images and the number of images in a document. To include an inline image, enter:

<IMG SRC=ImageName>

where ImageName is the URL of the image file. The syntax for <IMG SRC> URLs is identical to that used in an anchor HREF. If the image file is a GIF file, then the filename part of ImageName must end with .gif. Filenames of X Bitmap images must end with .xbm; JPEG image files must end with .jpg or .jpeg; and Portable Network Graphic files must end with .png.

Image Size Attributes. You should include two other attributes on <IMG> tags to tell your browser the size of the images it is downloading with the text. The HEIGHT and WIDTH attributes let your browser set aside the appropriate space (in pixels) for the images as it downloads the rest of the file. (Get the pixel size from your image-processing software, such as Adobe Photoshop.) For example, to include a self portrait image in a file along with the portrait's dimensions, enter:

<IMG SRC=SelfPortrait.gif HEIGHT=100 WIDTH=65>

NOTE: Some browsers use the HEIGHT and WIDTH attributes to stretch or shrink an image to fit into the allotted space when the image does not exactly match the attribute numbers. Not all browser developers think stretching/shrinking is a good idea. So don't plan on your readers having access to this feature. Check your dimensions and use the correct ones.

Aligning Images. You have some flexibility when displaying images. You can have images separated from text and aligned to the left or right or centered. Or you can have an image aligned with text. Try several possibilities to see how your information looks best.

Aligning Text with an Image. <Picture>By default the bottom of an image is aligned with the following text, as shown in this paragraph. You can align images to the top or center of a paragraph using the ALIGN= attributes TOP and CENTER.

<Picture>This text is aligned with the top of the image (<IMG SRC = "BarHotlist.gif" ALIGN=TOP>). Notice how the browser aligns only one line and then jumps to the bottom of the image for the rest of the text.

<Picture>And this text is centered on the image (<IMG SRC = "BarHotlist.gif" ALIGN=CENTER>). Again, only one line of text is centered; the rest is below the image.

Images without Text. To display an image without any associated text (e.g., your organization's logo), make it a separate paragraph. Use the paragraph ALIGN= attribute to center the image or adjust it to the right side of the window as shown below:

<IMG SRC = "BarHotlist.gif">

which results in: The image is centered; this paragraph starts below it and left justified.

Alternate Text for Images. Some World Wide Web browsers--primarily those that run on VT100 terminals--cannot display images. Some users turn off image loading even if their software can display images (especially if they are using a modem or have a slow connection). HTML provides a mechanism

to tell readers what they are missing on your pages. The ALT attribute lets you specify text to be displayed instead of an image. For example:

<IMG SRC="UpArrow.gif" ALT="Up">

where UpArrow.gif is the picture of an upward pointing arrow. With graphics-capable viewers that have image-loading turned on, you see the up arrow graphic. With a VT100 browser or if image-loading is turned off, the word Up is shown in your window. You should try to include alternate text for each image you use in your document, which is a courtesy for your readers.

Background Graphics. Newer versions of Web browsers can load an image and use it as a background when displaying a page. Some people like background images and some don't. In general, if you want to include a background, make sure your text can be read easily when displayed on top of the image. Background images can be a texture (linen finished paper, for example) or an image of an object (a logo possibly). You create the background image as you do any image. However you only have to create a small piece of the image. Using a feature called tiling, a browser takes the image and repeats it across and down to fill your browser window. In sum you generate one image, and the browser replicates it enough times to fill your window. This action is automatic when you use the background tag shown below. The tag to include a background image is included in the <BODY> statement as an attribute:

<BODY BACKGROUND="filename.gif">

Background Color. By default browsers display text in black on a gray background. However, you can change both elements if you want. Some HTML authors select a background color and coordinate it with a change in the color of the text. Always preview changes like this to make sure your pages are readable. (For example, many people find red text on a black background difficult to read!) You change the color of text, links, visited links, and active links using attributes of the <BODY> tag. For example, enter:

<BODY BGCOLOR="#000000" TEXT="#FFFFFF" LINK="#9690CC">

This creates a window with a black background (BGCOLOR), white text (TEXT), and silvery hyperlinks (LINK). The six-digit number and letter combinations represent colors by giving their RGB (red, green, blue) value. The six digits are actually three two-digit numbers in sequence, representing the amount of red, green, or blue as a hexadecimal value in the range 00-FF. For example, 000000 is black (no color at all), FF0000 is bright red, and FFFFFF is white (fully saturated with all three colors). These number and letter combinations are cryptic. Fortunately an online resource is available to help you track down the combinations that map to specific colors and there is software available for you to do this on your workstation:

•ColorPro Web server
•WebColor - downloadable software site

External Images, Sounds, and Animations. You may want to have an image open as a separate document when a user activates a link on either a word or a smaller, inline version of the image included in your document. This is called an external image, and it is useful if you do not wish to slow down the loading of the main document with large inline images. To include a reference to an external image, enter:

<A HREF="MyImage.gif">link anchor</A>

You can also use a smaller image as a link to a larger image. Enter:

<A HREF="LargerImage.gif"><IMG SRC="SmallImage.gif"></A>

The reader sees the SmallImage.gif image and clicks on it to open the LargerImage.gif file. Use the same syntax for links to external animations and sounds. The only difference is the file extension of the linked file. For example,

<A HREF="AdamsRib.mov">link anchor</A>

specifies a link to a QuickTime movie. Some common file types and their extensions are:

File TypeExtensionplain text.txtHTML document.htmlGIF image.gifTIFF image.tiffX Bitmap image.xbmJPEG image.jpg or .jpegPostScript file.psAIFF sound file.aiffAU sound file.auWAV sound file.wavQuickTime movie.movMPEG movie.mpeg or .mpg

Keep in mind your intended audience and their access to software. Most UNIX workstations, for instance, cannot view QuickTime movies.

Tables. Before HTML tags for tables were finalized, authors had to carefully format their tabular information within <PRE> tags, counting spaces and previewing their output. Tables are very useful for presentation of tabular information as well as a boon to creative HTML authors who use the table tags to present their regular Web pages. (Check out the NCSA Relativity Group's pages for an excellent, award-winning example.) Think of your tabular information in light of the coding explained below. A table has heads where you explain what the columns/rows include, rows for information, cells for each item. In the following table, the first column contains the header information, each row explains an HTML table tag, and each cell contains a paired tag or an explanation of the tag's function.

Table Elements. ElementDescription<TABLE> ... </TABLE>defines a table in HTML. If the BORDER attribute is present, your browser displays the table with a border. <CAPTION> ... </CAPTION>defines the caption for the title of the table. The default position of the title is centered at the top of the table. The attribute ALIGN=BOTTOM can be used to position the caption below the table.

NOTE: Any kind of markup tag can be used in the caption.<TR> ... </TR>specifies a table row within a table. You may define default attributes for the entire row: ALIGN (LEFT, CENTER, RIGHT) and/or VALIGN (TOP, MIDDLE, BOTTOM). See Table Attributes at the end of this table for more information. <TH> ... </TH>defines a table header cell. By default the text in this cell is bold and centered. Table header cells may contain other attributes to determine the characteristics of the cell and/or its contents. See Table Attributes at the end of this table for more information. <TD> ... </TD>defines a table data cell. By default the text in this cell is aligned left and centered vertically. Table data cells may contain other attributes to determine the characteristics of the cell and/or its contents. See Table Attributes at the end of this table for more information.

Table Attributes. NOTE: Attributes defined within <TH> ... </TH> or <TD> ... </TD> cells override the default alignment set in a <TR> ... </TR>. AttributeDescription

- ALIGN (LEFT, CENTER, RIGHT)
- VALIGN (TOP, MIDDLE, BOTTOM)
- COLSPAN=n
- ROWSPAN=n
- NOWRAP
- Horizontal alignment of a cell.
- Vertical alignment of a cell.
- The number (n) of columns a cell spans.
- The number (n) of rows a cell spans.
- Turn off word wrapping within a cell.

General Table Format. The <TABLE> and </TABLE> tags must surround the entire table definition. The first item inside the table is the CAPTION, which is optional. Then you can have any number of rows defined by the <TR> and </TR> tags. Within a row you can have any number of cells defined by the <TD>...</TD> or <TH>...</TH> tags. Each row of a table is, essentially, formatted independently of the rows above and below it. This lets you easily display tables like the one above with a single cell, such as Table Attributes, spanning columns of the table.

Tables for Nontabular Information. Some HTML authors use tables to present nontabular information. For example, because links can be included in table cells, some authors use a table with no borders to create "one" image from separate images. Browsers that can display tables properly show the various images seamlessly, making the created image seem like an image map (one image with hyperlinked quadrants). Using table borders with images can create an impressive display as well. Experiment and see what you like.

Fill-out Forms. Web forms let a reader return information to a Web server for some action. For example, suppose you collect names and email addresses so you can email some information to people who request it. For each person who enters his or her name and address, you need some information to be sent and the respondent's particulars added to a data base. This processing of incoming data is usually handled by a script or program written in Perl or another language that manipulates text, files, and information. If you cannot write a program or script for your incoming information, you need to find someone who can do this for you. The forms themselves are not hard to code. They follow the same constructs as other HTML tags. What could be difficult is the program or script that takes the information

submitted in a form and processes it. Because of the need for specialized scripts to handle the incoming form information, fill-out forms are not discussed in this primer. Check the Additional Online Reference section for more information.

Troubleshooting

Validate Your Code. When you put a document on a Web server, be sure to check the formatting and each link (including named anchors). Ideally you will have someone else read through and comment on your file(s) before you consider a document finished. You can run your coded files through an HTML validation service that will tell you if your code conforms to accepted HTML. If you are not sure your coding conforms to HTML specifications, this can be a useful teaching tool. Fortunately the service lets you select the level of conformance you want for your files (i.e., strict, level 2, level 3). If you want to use some codes that are not officially part of the HTML specifications, this latitude is helpful.

Dummy Images. When an <IMG SRC> tag points to an image that does not exist, a dummy image is substituted by your browser software. When this happens during your final review of your files, make sure that the referenced image does in fact exist, that the hyperlink has the correct information in the URL, and that the file permission is set appropriately (world-readable). Then check online again!

Update Your Files. If the contents of a file are static (such as a biography of George Washington), no updating is probably needed. But for documents that are time sensitive or covering a field that changes frequently, remember to update your documents! Updating is particularly important when the file contains information such as a weekly schedule or a deadline for a program funding announcement. Remove out-of-date files or note why something that appears dated is still on a server (e.g., the program requirements will remain the same for the next cycle so the file is still available as an interim reference).

Browsers Differ. Web browsers display HTML elements differently. Remember that not all codes used in HTML files are interpreted by all browsers. Any code a browser does not understand is usually ignored though. You could spend a lot of time making your file "look perfect" using your current browser. If you check that file using another browser, it will likely display (a little or a lot) differently. Hence these words of advice: code your files using correct HTML. Leave the interpreting to the browsers and hope for the best.

Conclusion

This guide has been adapted from the NCSA's beginners guide to HTML at http://www.ncsa.uiuc.edu/General/Internet/WWW/HTMLPrimerAll.html and is only an introduction to HTML, not a comprehensive reference. Remember to check a bookstore near you for Web and HTML books.

Six Elements of a Great Healthcare Website

David Reim, SimStar Digital Media

1) Know Your Audience

The first element of any great website is a design that is both relevant and meaningful for the group of people whom you wish to reach. For a healthcare site this is even more important because the types of visitors, and their range of knowledge, can be so varied. For disease or treatment specific sites that target consumers, your visitors might be Diagnosed Patients (both Grazers and Drillers), Potential Patients, Support Givers, or Knowledge Seekers. For sites that target physicians, your visitors might be Generalists (in terms of their knowledge of your specific content) or Specialists. For the allied healthcare visitors, you might have nurses, pharmacists, therapists, and a whole range of other support professions. If you are a publicly held company you will get visits from current shareholders, potential investors, and from analysts. In addition to the above you might get visitors from any of the following groups; Managed Care, Facility Administrators, Researchers, Employers, Potential Employees, Educators, Media, Policy Makers, or a host of others. Knowing your target audience(s), what messages you want to convey to them, and what you want them to do after they hear your message, is the first step in a great healthcare website.

2) The Right Content

The next step in your quest for a great website is to have the right content for your target audience. This can be described by the depth, quality, and medical accuracy of information offered at your site. Don't feel that all of your content has to be created new for the internet. Remember that the internet is just another channel of distribution for getting your messages to people, so reusing current printed pieces, video scripts, or other existing content is a great way to populate your site. However, once you've added content to your site, make sure that it is easily navigatable by your target audience. Finally, make sure that the medial accuracy of your site follows traditional regulatory and consumer protection guidelines, as well as new standards that are emerging for the internet.

3) Visual and Editorial Design

Once you have your content, you must present it in a manner that is appealing and useful to your target audience. Different audiences expect different levels of visual appeal and are willing to make tradeoffs in the design of your site. The visual design that is right for your site will depend on the target audience, the technology constraints you have specified for your site, what messages you are trying to convey, and the type of "character" you are trying to project. This character, in terms of both visual and editorial, creates a strong and recognizable personality for your site. After choosing your design, you must be consistent with this approach throughout your site.

4) Freshness

Unless one visit is enough for your target audience (which might be true!) then the continual incorporation and promotion of new content is another element of a great healthcare website. This new information must be timely and must fit the criteria of Content discussed in element #2 above. The challenge for most site managers is to find a cost-effective and organizationally efficient procedure for capturing new information and getting it onto the site. Once new information is online, you must use both proactive and reactive methods of promotion to let your users know about the new content.

5) Interactivity

One of the things that makes the internet different from other media channels is the ability to enable the user to "do" rather than to just "read". This interaction has been shown in study after study to effectively decrease the amount of time it takes a user to learn new information and to dramatically increase his or her retention rate. Good uses of interactivity effectively engages the user, adds value to the site, and encourages users to come back for repeat visits. Threre are many great examples of interactivity on healthcare sites that span the range from personalized services to risk assessments to edutainment.

6) Promotion

If no one knows your website exists, it doesn't matter how good it is; no one will come. There are many general ways of promoting your website including registering with search engines, proper use of meta tags and page titles, and incorporating your web address in your traditional media. For healthcare sites there are a variety of additional ways to promote your website including registering with medical directories, working with related organizations, and interacting with relevant newsgroups and mailing lists.

Use of Multimedia Tools for Nursing

Marie Reardon, Harrisburg Area Community College

This workshop will provide attendees with a feel for what software is needed to create multimedia presenations and what can be accomplished with the software. The presenter will demonstrate the process of creating a page or slide within a program. The authoring system chosen is an important consideration since it will determine the capabilities or limitations of what you will be able to create. Authoring a multimedia program involves selecting an appropriate background, then building what you want to convey to the student or user. Adding text, with its numerous selections of font, color and size is a good start. To make it interactive and interesting the selection of graphics both still and video, is desirable. Adding audio can give it zing or add emphasis. These are the basic elements of an interactive multimedia program.

Authoring System

Objects to perform coding- ie: buttons
Plain language converts to machine coded language
Control of Operating System
Multimedia functions - customization
Interactive
Hotwords
Links to other software
Testing
Scoring

Slide Background

Texture
Color
Design

Text

Font
Size
Color
Placement
Appearance

Still Photos

How to obtain photos
- Digital
- 35mm

Software - *Photoshop*
- Cut
- Croping
- Sizing
- Brighten
- Sharpen
- Change background
- Correct imperfections
- Pixels
- Color matching
- Save -file format- jpg, BMP, GIF, TIFF

Videos

How to Obtain
- Studio
- Camcorder

Software - *Digital Video Producer*
- Video Compression
- Intel Indio R3.2(32)
- Quality - always 100%
- Output format - Set size of Video
- Note - Capture largest size that you anticipate to use even though file is large.
- AVI size must be 3:4 ratio
  - ie: 180:240 or 240:360
- Bit depth
- Frame Rate - #of frames/second
  - standard in 16mm 24
  - In computer 15
- Determine smoothness
- Memory consideration
- Editing - Clip selection
  - Audio may be with it
  - Audio - mono 16 bits - 22.05KHz
  - stereo - music- convey concept of motion
- Altering of Clip
- Filters
- Transitions -used to convey time
- Build and save to file
- Name file
- Title
- Preview see if you like it

Audio

Software - *Audio Wave Studio*
- Editor
- Record
- Clip
- Edit
- Save

Criteria For Evaluating Interactive Multimedia Programs

David Byers, Carle Foundation Hospital
Dent M. Rhodes, Illinois State University

Though healthcare professionals have the experience and knowledge to confidently judge the content of health care training programs, they often have less experience in judging the design of health care training delivered in a multimedia format. This paper describes basic principles for evaluating multimedia training programs intended for use by health care providers and their patients. These evaluative principles are derived from well-established principles of task learning, motivation, and media development as adapted to specific organizational settings. Evaluative principles and related features for both program design and program delivery are included.

Program Design Principles

Supportive Environment. Program design should provide both cognitive and affective support for users. Among design features to support users are system guidance, alternative input devices, exit on request and re-entry at exit, mistake retrieval, and a helpful persona.

Meaningful Application. Program outcomes and tasks should be related to situations familiar to users or situations they will likely encounter. Among design features to provide meaningful application are explicitly stated benefits/payoffs, a problem orientation, and familiar positive and negative illustrations.

Opportunities for Choice. Program tasks should give users, especially professional adults, choices of how they will interact with mediated instruction. Users welcome suggestions, but not arbitrary directions. Among design features that provide for choice are alternative learning structures, non-conditional branching, proactive menus, and user control of program pace, scope, sequence and media.

Manageable Tasks. Program tasks should be within the capability of the user and lead to desired outcomes. These tasks must be arranged systematically, with content and procedures explicitly stated. Among design features that help ensure manageable tasks are entry audit, learning task discrimination, learning task specificity, and learning task hierarchies.

Performance Examples. Program tasks should be illustrated with multiple examples. Among design features that provide performance examples are positive, negative and borderline examples, both real and realistic.

Performance Opportunities. Users should have the opportunity to practice what they are expected to learn. Among design features that provide performance tasks practice opportunities are performance coaching, case-study scenarios, and integrated video-taped role playing.

Knowledge of Progress. Program users should have information on their progress in order to make judgments about the adequacy of their performance. Among design features that provide knowledge of results are individualized feedback, conformational and corrective feedback, feedback on request, and personalized achievement summaries.

Success Opportunities. Program users should have more than one opportunity to complete learning tasks successfully. They should be able to make errors, especially in problem-solving situations. Among design features that provide success opportunities are multiple assessments, performance examples on request, and multiple achievement levels.

Multisensory Techniques. Multimedia training program design should include alternative "perceptual modalities" to accommodate diverse user learning preferences and styles. Among program features that provide a multisensory learning environment are balanced communication and task-specific media.

Intuitive Appeal. Multimedia training program design should engender positive responses on the part of users. If not carried to extremes, features that can provide emotional, intellectual, and aesthetic appeal are humor, competition, topicality, novelty, and visual unity.

Program Delivery Principles

Textual Literacy. Program text should be directly related to the literacy level of the users. Alternative program versions are required for users with different reading levels or in languages common to intended users.

Computer Proficiency. The level of computer skills required in the program should be matched to the skills levels of intended users. Alternative versions incorporating keyboard, mouse, or touch-screen input may be required.

Interface Simplicity. The interface design should be "transparent and simple." That is, users should be able to navigate through the program without conscious effort, retrieve mistakes, and receive predictable responses to their choices. Consistent, color-coded, input conventions and text placement can reduce information overload.

Error-Free Operation. Each component of the program should operate without error: computer "hang-ups" and "fatal errors" must be avoided, audio and video segments must be audible and viewable. Multimedia training should not be distributed in "beta" or "field-test" versions unless users understand they are part of the development process.

Organizational Settings

A quality multimedia program for heath care training will incorporate the above principles. Program quality will increase as the number of features increase and decease when features are missing. However, there is no automatic formula to determine the quality of a given multimedia training program. Each health care organization will have its own set of values that determine the significance of the principles and related features. There are situations in each organizational context that influence decisions and each organization must construct its own evaluation forms.

There also will likely be institutional parameters and terminology that would be incorporated into an organizational evaluation form or checklist. This will reduce the time needed for form development. For example, a training department may be familiar with terms such as "modeling" "growth opportunities," and "production quality." These categories could be used to include program features described above as performance examples, knowledge of progress, and error-free operation.

The evaluation principles described in this paper are thus tools to be used by those responsible for selecting interactive multimedia health care training programs. They are intended to assist organizations in developing their own evaluation procedures; they are not substitutes for sound professional judgments.

Multimedia Courseware: A Teaching-Learning Strategy

JoAnn Blake, RN, PhD, Prairie View A&M University
Jennifer Goodman, RN, PhD, Prairie View A&M University

Multimedia computer-based courseware is fast becoming one of the most popular teaching-learning strategies. Multimedia courseware can be used to transform learning into a dynamic process in which the student is an active participant. The classroom is expanded beyond the walls of a lecture hall, making education a learner-friendly activity. When fully integrated into the curriculum, computer courseware allows more flexibility in the learning environment. It permits both individualized and collaborative group learning. Computers and multimedia courseware have become a vital component in the education of College of Nursing students.

Computer courseware is used in the classroom for collaborative decision making, application of concepts and critical thinking activities. Courseware used in the classroom provides students the opportunity to apply theoretical concepts to a practical situation. Computers are used to create a dynamic classroom environment in which problems can be analyzed, alternatives dissected and the results of decisions vividly demonstrated without consequences to actual clients. During the discussion, faculty guides students through the decision making process. The computer becomes a catalyst in the classroom and students gain valuable experience in collaborative decision making and problem solving. Success brings feelings of achievement for the class while failure challenges students to examine the process they used to arrive at the incorrect decision.

Application exercises in the form of clinical scenarios, case studies, games and simulations are incorporated into classroom activities. These exercises focus not only on answering questions but permits the learner to make decisions, select alternatives and seek solutions to clinical problems. The computer is use to make facts and figures come alive. Multimedia courseware used in College of Nursing classrooms is designed by faculty.

Computer courseware is available for student use in the classroom and Learning Resource Center (LRC). Computer assignments are included on the class syllabus as required activities. Selected concepts are presented on the computer rather than taught in the classroom. Students complete assignments in the LRC individually and in small groups. Commercial and faculty-designed programs are used as computer assignments. A bulletin board in the LRC informs students which computers contain their assigned lessons. A sign-in system is used to monitor and document computer usage. Computers are accessible at times that are convenient for the learner.

Daily quizzes and clinical laboratory examination s are given on the computer. One of the benefits of using computers for tests is that it frees up class time for enhancement activities and class discussion. If a quiz is taken outside the classroom, class discussion can focus on strengths and weaknesses identified in the test analysis provided by the computer lesson.

Positive outcomes have been reflected in higher examination scores and course grades. Student evaluations indicated decreased stress, increased motivation and greater ability to process information. Faculty found that the multimedia effects of lessons captures and held the attention of students longer than traditional lectures. The use of computer assignments has increased the amount of time students are engaged in learning activities. Student request for more computer lessons has helped to validate the effectiveness of using computer courseware in the classroom. Computers have become an important tool in the educational process. Both faculty and student evaluations have indicated that the use of multimedia courseware is an effective teaching-learning strategy.

Competence and Cost Effectiveness: Crosstraining and Remediation with CAI

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Changing Environment

Crosstraining staff has become the buzz word of the 90's as the changes in healthcare have occurred. Managed care, decreased length of stay and declining census with the advent of increased home care have placed a financial crunch on our healthcare facilities. The luxuries once attributed to healthcare are merely a fleeting reality. The new reality includes: mergers, downsizing, staff competence, flexibility and ethics. As small facilities struggle to survive, larger academic centered medical centers stretch their zone of influence to gather a profitable market. Every health care organization is reorganizing, right sizing, and looking at all potential ways to become more efficient, appropriate and effective with all its resources, including the human kind. Crosstraining staff to be able to work in more than one unit or environment is being looked at closely as a viable response to the needs for increased staff flexibility and skills.

Definitions and Objectives

Over the past 4 years our rural hospital has investigated crosstraining and has been successful in instituting a program that has provided the hospital with the flexibility and skill development essential to remain solvent in today's health arena. The first group of staff that were selected to entertain the idea of crosstraining were the nurses, since that model had already existed in the traditional float pool of nurses. However, the nursing leadership group and the education director felt that definitions and objectives be developed in order for the concept to work well. After much discussion, definitions and objectives were written and policies regarding crosstraining were approved. For this to work it was essential that every one was speaking the same language and goals were agreed upon. Looking back, the decision to develop these definitions and policies was perhaps the most important. The importance of defining the differences between "float" and "crosstrained" became more evident as we discussed competence and cost effectiveness issues.

Crosstrained vs Float

A crosstrained nurse was one who would, after adequate training and demonstration of skills, be able to staff her crosstrained unit whenever the need arose. She would function as a staff nurse with an assignment that was manageable. A float was simply a nurse who would "help out " on a unit when they were short handed, but she would not take an assignment. A crosstrained nurse was more cost effective because she was considered nursing staff. A float was often an expensive extra pair of hands. To maintain her competence and effectiveness on a unit ,a crosstrained nurse would be scheduled at least once a month on that unit. The reality was that she was often scheduled twice a month or brought into the unit as a staff nurse when the census was high in that unit or the census was low in her home unit.

Crosstraining Packets

Once the definitions and policies were completed, the educational design was developed by me, the educator. In order to provide the optimal skill experience with a variety of opportunities in an efficient but sufficient length of time, I decided to continue the concept of clarity by developing "Crosstraining Packets". These packets contained the objectives for the required skill base, a competency based skill assessment, and the educational media necessary to obtain the didactic information and the critical thinking skills. I chose to hone in on the skills acquisition necessary to function with a preceptor in the actual setting. Computer Assisted Instruction provided the didactic information, the scenarios for decision making based on knowledge obtained ,and the freedom from fear of making a critical error in the clinical setting. I developed a packet for each unit: SCU, Telemetry, Med/Surg, Birthing Center, Perioperative Care, Emergency , Operating Room, and Ambulatory Care. I worked with nurse managers and nurses to develop the objectives for each packet and assure that all the critical skill be included. Often the competency based skills were arranged from the basic to the more critical. In that way experienced Med/Surg nurses often were able to quickly arrive at the critical skills since their skills were already honed in the basic areas. Specialty unit nurses, on the other hand, often were forced to redevelop some basic skills because their specialty unit did not address certain ones. Computer Assisted Instruction

provided them the opportunity to review in more depth that which they needed and progress to the more critical in an individual manner.

Research shows that learning retention and knowledge acquisition is increased when the learner hears, sees, understands and acts upon that understanding. In lecture we only retain 10-30 % of what we listen to. But with CAI, we must take what we hear and see and act upon it in a critical manner without the barriers to learning of fear, intimidation, and time constraints. The nurses who have been crosstrained found the CAI to be stimulating and safe prior to being placed in the clinical setting.

Positive Results

Over the past 1 1/2 years, 59% of our nurses have been crosstrained to one other unit. 19% have been crosstrained to more than one other unit. Evaluations indicate that the crosstraining packets and the use of CAI for the knowledge base were the strengths of the program. Everyone knew what the expectations were and were able to access the computers when needed.

This program was further enhanced by the cooperation of the nurse managers in prioritizing needs. Once the priorities were decided, the skills necessary for acquisition were delineated, and those nurses who volunteered and were strong in their respective fields were selected. All staff nurses were explained the program and were encouraged and supported in their decision to crosstrain. This newly skilled group of people would provide flexibility to staffing patterns and bring an opportunity to contain costs by using in house resources versus premium paid per diems and the use of overtime. Once these nurses were in use, a CQI project was initiated to quantify the use of OT, per diems and crosstrained staff. The graphs over the last 6 months indicate a general decrease in the use of OT and per diems and the increase in use of crosstrained nurses with an across the board decrease in the projected salary disbursement. Another positive aspect of this has been that the crosstrained nurses use less "required time off" than the uncrosstrained nurses because their enhanced skill level provides them the opportunity to take an assignment in another unit rather than be sent home when their unit is at a low census.

CAI Delevery

To aid in the efficient delivery of the CAI to the nurses, two computers, affectionately known as NED and NEDine (Nursing Ed. Dept) were mounted on rolling carts and rolled to wherever the nurse was that needed to access the mounds of CAI installed on the hard drives. Armed with her packet, on her downtime or on scheduled ed time she would access the CAI programs required for her crosstraining experience. Scores would be printed and she could redo or review as often as necessary. Often clinical experience would be piggybacked to the new skill acquisition. When the two computers were not on the move, they would be housed in the New Interactive Learning Center where they could also be accessed in a quieter environment with other resources available. Both methods have been used by the crosstrainers depending on their learning style. As the educator, I provide support but I allow the CAI to provide the magic. I have perused hundreds of CAI titles and have purchased the CAI which is required for my crosstrainers to function successfully in their newly crosstrained unit. It is important to preview CAI in order to select the effective and appropriate mix. CD-ROM titles are improving daily and I am moving away from the text driven and more into the interactive simulations which encourage critical thinking.

In terms of remediation of nurses, any nurse who feels she needs more opportunity for critical thinking or didactic knowledge, she can access the recommended CAI. If a nurse manager indicates on a performance appraisal concern for a staff member, we can develop a plan using CAI for remediation. I have frequently used CAI regarding medication errors for those nurses who make med errors. These programs review the reasons behind med errors and reinforce the ways to prevent them. I have met with success in this. CAI for the JCAHO's Age Appropriate Care standards has provided many nurses with the skills necessary to care successfully for the various ages.

Conclusion

It is fair to say that CAI is a powerful tool to aid in the development of a successful crosstraining and remediation program. But by itself CAI is not a panacea. It is essential to develop an organized, clear and supported program in order that the CAI is used effectively and consistently to insure competence while developing a flexible, highly skilled staff.

Virtual Reality IV Simulator

Virginia L. Barker, EdD, RN, Plattsburgh State University of New York

Introduction

In 1995, the faculty of the Department of Nursing at the State of New York (SUNY) at Plattsburgh began work with HT Medical to develop a virtual reality (VR) simulation to teach nursing students how to insert needles for intravenous (IV) infusions.

Selection of Procedure

Venipunctures was selected for the first technique to be simulated because:

- it is invasive;
- it is one of the most commonly performed procedures by a wide variety of health care workers with varied backgrounds and preparations;
- it can cause undue patient discomfort when performed with a lack of skill;
- actual practice on patients is commonly used.

Development Process

The faculty sent Dr. Merril and HT Medical's staff the following information:

- the syllabus of the course in which venipuncture was taught;
- the nursing curriculum plan which would show supporting science courses, i.e. anatomy, physiology, chemistry as well as other nursing courses;
- particular difficulties such as anatomical variations anticipated by faculty teaching the venipuncture procedure;
- specific case studies to be included;
- clinical problems to be simulated; an objective evaluative process to be incorporated.

In preparing this material, the faculty used the Intravenous Nurses Society Standards of Practice to ensure safe clinical execution of the procedure in the simulation exercise. Six client scenarios have been developed to test clinical decision making. The patients present the most commonly found anatomical situations, a normal vein, a rolling vein, a sclerosed vein, and a vein in an obese patient. The six patients presented are diverse in age, gender, and race. After determining the placement of the tourniquet and the intravenous needle the student manipulates the syringe connected to the VR input device to simulate the insertion of the needle. As the needle "penetrates" the skin, then the vein, two force feed

Evaluation

As the virtual reality simulation is incorporated into the curriculum, its effect will be carefully evaluated and the results will provide valuable data for future simulation efforts.

- Does the prototype simulation offer sufficient realism? Is the relationship between morphological structures accurate enough to teach the requisite anatomical skills?
- Does the pacing of the prototype simulation accurately reflect the flow of the actual procedure? Have the appropriate procedural sub-steps been emphasized, or should the emphasis be shifted to other sub-steps to enhance the training efficacy of the simulation?
- Does the prototype simulation exhibit the necessary force feedback? Does the user interact with the medical instruments in a manner consistent with the real procedure?
- Does the prototype simulation serve to adequately prepare the user in the development of the appropriate motor skills?

In addition, what do we want to know about the use of VR simulations versus traditional teaching methods?

- How do experienced instructors and "mentors" rate the performance of both historical and contemporary student populations taught using conventional methods in comparison with the sample population taught using the VR simulation?
- How does the sample population perform with actual patients?

Future

The next step will be to develop a cost effective second generation virtual reality simulation for needle insertions which can be marketed. At present, a Silicon Graphics Indigo2 computer is needed for the simulation. However, it is believed that the program can be adapted to run on a Pentium PC with one additional program board, thus placing it within the financial reach of educational programs everywhere.

Summary

In conclusion, in order for virtual reality simulations to move from the R & D laboratory to the teaching classroom on a large scale basis, there are four conditions which must be met: faculty involvement, student cooperation, affordable equipment and administrative support.

1) Faculty must understand the advantages of using VR simulations and be committed to developing the procedures and teaching modules and evaluating their effectiveness. They must understand that the simulations are another teaching tool and not a substitute
2) Students must be guided in the use of VR simulations to develop the level of skill required. Students must be willing to accept new ways of learning and must be able to see their individual learning progress in skill development.
3) Equipment--Must be realistic, affordable, available and clearly demonstrate advantages over traditional methods of teaching.
4) Administrative Support--Initially the cost of instituting VR simulations may be more than using other more traditional teaching tools, thus ongoing financial support is very important.

I believe that the faculty of the Nursing Department at the State University of New York at Plattsburgh is showing the way in incorporating VR simulations into a traditional undergraduate nursing program and as a result they are changing forever the way

Patient Education "Communities of Interest" on the Internet

Sonja Halvorson, MediaLinx Interactive
Paul A.W. Gamble, MediaLinx Interactive

Introduction

This presentation will examine the emergence of a new consumer health education/health promotion phenomenon called "Communities of Interest". The presentation will illustrate some of the realities and challenges which this emerging concept must address, will outline how health educators can leverage this environment, and will demonstrate, via the Internet, a unique approach developed by the Canadian web site *HealthyWay™*.

Background

Just what are Communities of Interest? From our perspective, Communities of Interest can be best thought of as:

> *"For a particular consumer perspective or interest...a mechanism/methodology of bringing together a wide variety of on-line resources and people; for example a diabetes community, an asthma community, a healthy eating community, etc."*

Health responsible consumers who will participate in such communities will go about collecting health information in active and innovative manners. But, unlike the traditional model, where the scientific and medical base of information is accessed by the doctor and then only such information as is deemed necessary is passed on to the patient, in the Community of Interest approach, although the doctor and other health care professionals remain important sources of information, the consumer will seek other information from many additional sources and they will retain the right to consult, seek support and negotiate.

Communities of Interest:

While there are many tools being tailored for this community of interest perspective including telephone, voice mail, fax-backs, interactive computer software, decision support tools, home health stations and interactive television, it is the Internet that offers perhaps the most unique current response capability.

The Internet provides a vast amount of world-wide information and support available in real time. Information on the Internet is created by both professionals and lay persons. There are literally thousands of discussion groups, electronic bulletin boards and chat groups on just about every conceivable health topic and interest.

The objective from a health perspective of establishing an Internet Community of Interest is that by bringing like-minded individuals together they can learn from one another, network, get expert advice, and have access to resources tailored to their specific needs. Health consumers often have fairly specialized interests and have a need to interact with a larger base of people than can be found in their physical neighbourhoods. The Internet holds the potential to respond to each of these requirements.

From the educational opportunity perspective there is also a great deal of appeal to the Communities of Interest concept. The Internet world moves at a fast and furious pace. According to Business Week Magazine (May 5, 1997), a study by the University of Minnesota found that if a site did not capture a Web surfer's interest within eight seconds they were gone off to another site. They also found even if a surfer stayed at site the average visit lasted only seven minutes. However for the emerging Communities of Interest the case was different. The very existence of discussion groups or chats about a topic consistently boosts traffic on any Web site by as much as 50% - and discussion group participants hang around an average of thirty minutes. Thus a site organized as a Community of Interest that caters to specialized interests, provides a wealth of opportunity to provide educational material and have visitors participate in health education and/or health promotion activities. For individuals or organizations involved in managing the care of their clients this enhanced contact and educational opportunity should prove extremely beneficial.

The HealthyWayTM Approach

HealthyWayTM is a gateway to a world of health information from a Canadian perspective. It is designed for people who are healthy and want to stay that way; people with health conditions or problems; or people who simply want to ask health questions with anonymity.

The HealthyWayTM approach to Communities of Interests organizes all the information content of the site - i.e., Health Links (i.e., site reviews), Health Talk (i.e., discussion groups and forums), Games and Quizzes, Healthy You (i.e., interactive questionnaires and medical triage applications), Reference Tools, HealthyWay NewsStand (i.e., on-line magazines), Healthy Recipes - in a manner focuses on a particular interest or topic. The ultimate objective of the HealthyWayTM Communities of Interests is customize and organize the vast array of information and resources in order to enhance consumer/patient education and health promotion.

Note: HealthyWayTM is fast on its way to accomplishing the goal of becoming the "Canadian consumer's on-line choice for health information". On April 30th, 1997 HealthyWayTM won the International Digital Media Award for People's Choice Best World Wide Web Site.

Telecommunications and Information Infrastructure Assistance Program (TIIAP)

Shari Wyatt, NTIA, US Dept of Commerce

The Telecommunications and Information Infrastructure Assistance Program (TIIAP) is a highly-competitive, merit-based grant program that brings the benefits of an advanced national information infrastructure to communities throughout the United States. TIIAP is a Clinton Administration initiative that plays an important role in helping to realize the President's vision of connecting all schools, libraries, hospitals, and community centers to the information superhighway. Many projects to connect rural and urban underserved Americans to information networks would never occur without the Federal assistance provided by this program.

TIIAP provides matching grants to non-profit organizations such as schools, libraries, hospitals, public safety entities, and state and local governments. Grants are used to fund projects that improve the quality of, and the public's access to, education, health care, public safety, and other community-based services. The grants are used to purchase equipment for connection to networks, including computers, video conferencing systems, network routers, and telephones; to buy software for organizing and processing all kinds of information, including computer graphics and databases; to train staff, users, and others in the use of equipment and software; and to purchase communications services, such as Internet access.

Since its inception in 1994, TIIAP has generated tremendous interest. The program has received more than 3,600 applications, requesting $1.5 billion, from across the country. Because TIIAP is a matching grant program, the applications have spawned hundreds of millions of dollars in commitments from local, state, and private sector sources.

Since 1994, TIIAP has award 277 grants in 50 states, the District of Columbia and the U.S. Virgin Islands. Approximately $79 million in Federal grant funds were matched by more than $133 million in non-Federal funds. A significant portion of the funding went to rural regions and rural states, where telecommunications has the power to bring new opportunities for learning and job creation to residents in isolated areas.

TIIAP projects will help bridge information gaps for children in farming communities and urban inner cities, bring improved health care to elderly patients without them having to leave their homes, provide worker training and new job opportunities in economically depressed areas, and improve public safety by extending emergency telephone service throughout the country. By serving as models that can be replicated in similar communities across the country, TIIAP projects extend their benefits far beyond the communities in which they take place, and provide economic and social benefits to the nation as a whole.

On January 27, 1997, NTIA announced that approximately $18.5 million is available this year for the TIIAP grant round. The deadline for submitting applications was March 27, 1997. On November 7, 1996, NTIA announced the release of the report "Lessons Learned from the Telecommuniations and Information Infrastructure Assistance Program". This report presents the initial lessons learned from the TIIAP projects that were funded in 1994 and 1995. The Executive Summary of the report is available on-line. If you would like to request a copy, please send your name and address to tiiap@ntia.doc.gov , fax us at (202) 501-5136 or (202) 501-8009, or request a copy on-line.

Select 1996 Health Grant Awards

North Slope Borough, Barrow, Alaska. The North Slope Borough (NSB), together with NSB School District, Ilisagvik College, and the Active Slope Native Association, will implement Project AuroraNet, designed to serve eight rural North Slope communities. The project will allow these communities to share resources, design, plan, implement, and manage a single unified community-based Wide Area Network. With the new network, clinics in each community will be linked using compressed video to the Indian Health Service hospital in Barrow; similar technology will link the Barrow hospital to the Alaska Native Medical Center in Anchorage. The new configuration will enable the Anchorage hospital to exchange medical records with Barrow more efficiently—today, patient records often take weeks or months to reach Barrow by mail from Anchorage. In addition, improved high-speed

communication among the various health facilities is expected to reduce by more than 20 percent the need for Medivacs between Barrow and village clinics, and between Barrow and Anchorage. The network will also improve billing procedures and facilitate physician interaction for diagnoses. Demonstration Project / Community-Wide Networking Federal Award: $350,000. Total Project Cost: $700,000. Grant Term: one year. Contact:James P. Sharpe, 1287 Agbik Street, Barrow, AK 99723; 852-0240.

University of Arizona, Tucson, Arizona. The University of Arizona will use TIIAP funds to develop a plan for the integration of Arizona's three Enterprise Communities (EC) into the state funded Arizona Telemedicine Network. The enterprise communities are San Luis, Douglas, and Nogales. These communities, located in the counties of Yuma, Santa Cruz, and Cochise along the Arizona/Mexico border, have nearly doubled in population over the last 20 years. This increase in population has stretched community resources, including health care services, and has forced the communities to search for external support. Planning Project / Health Federal Award: $49,999. Total Project Cost: $100,029. Grant Term: one year. Contact:Alison Hughes, Arizona Board of Regents, 888 N. Euclid #510, Tucson, AZ 85722; 626-7946.

White Mountain Apache Tribe, Whiteriver, Arizona. The White Mountain Apache Tribe will use a TIIAP grant to gain access to the Internet for the first time. Once the project is underway, it will provide community-wide networking to assist in the economic development, lifelong learning, and improved delivery of health services and information to the region. The tribal information system will create electronic access to the Tribal Business Office, with additional wireless access to remote local tribal organizations, the school system, and the Indian Health Hospital. Access Project / Community-Wide Networking. Federal Award: $249,459. Total Project Cost: $556,299. Grant Term: two years. Contact: Joe Waters, White Mountain Apache Tribe, PO Box 700, Whiteriver, AZ 85941; (520) 338-4346 x222

Hawaii Department of Health, Honolulu, Hawaii. The Hawaii State Department of Health will use TIIAP funds to develop a plan to use telemedicine technology to improve the delivery of mental health services. The Hawaii Telemedicine Planning project will determine the most efficient approach to delivering telemedicine in Hawaii and focus on providing telemedicine services to Island residents with mental health disorders. Participants in the Hawaii Telemedicine Planning Project include the Departments of Health and Business, Economic Development, and Tourism; School of Medicine, University of Hawaii; Tripler Army Medical Center; the Chamber of Commerce; private telecommunications corporations; and community health organizations. Planning Project / Health. Federal Award: $51,985. Total Project Cost: $103,970. Grant Term: one year. Contact: Jeanette Takamura, Hawaii State Department of Health, 1250 Punchbowl Street, Honolulu, HI 96813; 586-4412.

Fort Wayne Area InfoNet, Fort Wayne, Indiana. Fort Wayne Area InfoNet, a community network, plans to expand access to its services for the first time to individuals with disabilities in the Fort Wayne area. "Capacity-4-Access for People with Disabilities" aims to accomplish two separate goals: (1) build the capacity of human service agencies to provide assistive technology information to people with disabilities and (2) improve the independence of people with disabilities by helping them to obtain assistive technology and disability-related information. (Assistive technology provides customized information interfaces, such as special keyboards or voice activated computers.) Access Project / Human Services. Federal Award: $140,000. Total Project Cost: $335,180. Grant Term: 17 months. Contact: Jeffrey Krull, Fort Wayne Area Infonet, 900 Webster Street, P.O. Box 2270, Fort Wayne, IN; (219) 424-7241 x2252.

National Cancer Institute SBIR/STTR Grants

Connie Dresser, National Cancer Institute

The Small Business Innovation Research (SBIR) Grant and the Small Business Technology Transfer Research (STTR) Grant (created in 1993) are used by the National Institutes of Health (NIH) to fund small companies that develop technological, innovative, and cost-effective scientific solutions for translating basic science knowledge into chronic disease prevention and care products and services.

SBIR GRANTS

Any company qualifies as a small business if it is independently owned and employs 1-499 employees. The principal investigator (PI) must work for the small business more than 50% of the time (which precludes full-time employment at any other organization). The PI is responsible for the scientific and technical direction of the project. The SBIR program has three grant phases:

PHASE I proposals describe the technical merit and feasibility of proposed research and development (R&D) efforts. A final report is used to evaluate the quality of the PI's performance. At present, up to $100,000 is awarded for direct costs, indirect costs, and fixed fees not to exceed a 6-month period.

PHASE II proposals describe an expansion of the PI's Phase I research and development. Funding is based on Phase I outcomes and the scientific and technical merit and commercial potential of the Phase II application. At present, up to $750,000 is awarded for direct costs, indirect costs, and fixed fees not to exceed a 2-year period. Phase I/II Submission Dates: April 15, August 15, and December 15.

PHASE III is the non-government funded period of commercialization.

STTR GRANTS

The STTR grant is used to fund a small business that "collaborates" with a non-profit organization, that is owned and operated exclusively for scientific or educational purposes, in a project that has commercial potential. An agreement to share the profits resulting from this joint venture is documented by both parties prior to Phase II funding.

The PI may come from either the small business or from the non-profit organization. If the PI comes from the latter, a letter is sent to the small business and NIH indicating what percentage of the PI's staff time will be spent on the grant. The small business sends a letter to the non-profit organization and to NIH stating that the PI will be an "adjunct member" of the business for the duration of the grant for the sole purpose of completing all phases of the grant. The non-profit organization receives funds from the STTR grant via a subcontractual agreement and the PI is paid by the non-profit organization. The STTR program has three grant phases:

PHASE I proposals determines the scientific, technical, and commercial merit and feasibility of the proposed cooperative effort, and assesses the quality of performance by the small business. At present, up to $100,000 is awarded for direct costs, indirect costs, and fixed fees not to exceed a period of one year.

PHASE II proposals describe the expansion of the R&D efforts completed in Phase I. Funding is based on Phase I results, scientific/technical merit and commercial potential of the Phase II application. At present, up to $500,000 is awarded for direct costs, indirect costs, and fixed fees not to exceed a period of 2 years. Phase I/II Submission Dates: April 1, August 1, and December 1.

PHASE III is the non-government funded period of commercialization.

Contacts: Phase I/II Instruction Manuals/Applications:

Phase I SBIR or STTR: 301/206-9385
Phase II SBIR or STTR: 301/435-0896
Fax Number: Inquiries & Mailings 301/206-9722

NCI Multimedia Technology Research Categories

To meet the recommendations and priorities established for the National Cancer Institute, the Multimedia Technology Grant Program challenges small business applicants to translate cancer research into prevention and care messages, services, and interventions acceptable to the public and/or primary care givers that result in positive behavior changes.

Applicants are required to develop, implement, and test the effectiveness of a new or existing model of behavior modification or informational/ educational application to reduce the risk of cancer or promote the health of cancer survivors. Applicants are expected to use computer applications, expert systems, advanced telephone technologies, video-text, cable and broadcast television, radio, virtual reality, animation, or the internet/world-wide web to translate cancer research in the following categories:

1.INNOVATIVE ALTERNATIVE TEACHING METHODS. Develop cost and time-effective approaches for use by professional and lay-educators to teach the lay-public about cancer prevention.

2.INTERNET/WORLD WIDE WEB APPLICATIONS. Establish user-friendly sites to provide scientific and practical information about cancer prevention and care, and national/community resources.

3.LIFE STYLES. A) Promote awareness of habits that increase and decrease cancer risk among specific cultural, gender and age groups. B) Evaluate the use of non-health models to alter behavior with health behavior modification objectives.

4.NUTRITION INTERVENTIONS. Identify food-related behaviors among specific population groups that are associated with increased cancer risk and develop appropriate interventions to modify behavior.

5.PRIMARY CARE PROFESSIONALS. A).Develop or increase knowledge about user-friendly cancer databases, screening and assessment tools, treatment techniques, and community programs and resources. B) Develop information modules for primary care providers to extend their knowledge of cancer prevention and care, or appropriate approaches to use with patients. C) Develop training techniques or modules for cancer screening, assessment, and follow-up.

6.SMOKING AND TOBACCO CESSATION INTERVENTIONS. Develop programs that identify how best to prevent the use of tobacco products or modify the smoking behaviors of high-risk populations.

7.SPECIAL APPROACHES AND CONSIDERATIONS. For minorities, special groups and specific cancers, identify and include special approaches and considerations when developing screening, assessing, monitoring, and/or educational tools.

8.SYSTEMS FOR THE PUBLIC. A) Cancer Education: increase knowledge about causes of cancer (environment), risk reduction options, and treatment options for specific cancers. B) Cancer Information: increase knowledge about cancer databases, screening/ assessment tools, treatment techniques and community resources and programs. C) Cancer Prevention: increase awareness about how personal attitudes, behaviors, and practices impact on one's health and influence cancer risk. D) Screening and Assessment: develop occupational or environmental worksite screening and assessment programs for employers and their employees, and/or develop methods for stimulating participation in detection and intervention programs. E) Tracking Systems: develop effective tracking mechanisms that 1)identify users/nonusers of cancer screening procedures, assess follow-up and out-come of users, 2) identify barriers of use and 3) provide solutions for specific populations.

9.TELEHEALTH/TELEMEDICINE APPLICATIONS.

For more information, including a list of previously funded applications, visit our web site at http://www.dcpc.nci.nih.gov/pceb/mtgp/.

The Foundation Center

Pat Pasqual, Washington Office, The Foundation Center

The Foundation Center is an independent nonprofit information clearinghouse established in 1956. The Center's mission is to foster public understanding of the foundation field by collecting, organizing, analyzing, and disseminating information on foundations, corporate giving, and related subjects. The audiences that call on the Center's resources include grantseekers, grantmakers, researchers, policymakers, the media, and the general public.

Foundation Center Libraries. The Foundation Center operates libraries at five locations. These include national collections at its headquarters in New York City and at its field office in Washington, D.C., and regional collections at its offices in Atlanta, Cleveland, and San Francisco. Center libraries provide access to a unique collection of materials on philanthropy and are open to the public free of charge. Professional reference librarians are on hand to show library users how to research funding information using Center publications and other materials and resources.

Orientations. Each Center-operated library offers free weekly orientations on the funding research process. These orientations are designed to give representatives of nonprofit organizations an overview of the foundation and corporate giving universe and to introduce them to the effective use of the Center's publications, resources, and services. Center staff can also tailor orientations to the specific needs and interests of various groups. To learn more about the Center's orientations or to schedule a library tour, call the Center-operated library nearest you or click here.

Reference Materials Found at Center Libraries. Forms 990-PF: Internal Revenue Service information returns are filed annually by more than 40,000 U.S. private foundations. These forms are often the only primary source of information on the many foundations that do not issue annual reports. Information provided on 990-PF forms includes fiscal data, grants awarded by a foundation, and the names of the foundation's officers and trustees.

Grantmaker Materials: Each library maintains an extensive collection of foundation annual reports and corporate giving reports, as well as newsletters, press releases, and application guidelines.

Directories, Books, and Periodicals: Foundation Center-operated libraries have available for public use multiple copies of the Center's publications, in addition to hundreds of other directories, books, and periodicals on such topics as fundraising, board relations, corporate responsibility, foundation salaries, nonprofit management, and program planning.

Foundation and Nonprofit Literature Online: The Center's bibliographic database contains listings for more than 12,000 books and articles, many with abstracts, relating to philanthropy and the nonprofit sector.

Congressional Research Service Resources. Since 1985, the Center has regularly provided the Congressional Research Service (CRS) of the Library of Congress with eight complimentary sets of its core publications. These collections are located in the Congressional Reference Division, in two Congressional Reading Rooms, and in four House and Senate Reference Centers, where they are available to congressional staff responding to constituent requests for grants and funding information.

Cooperating Collections. The Center's Cooperating Collections are located in public libraries, community foundation offices, and other nonprofit agencies in all 50 states. Cooperating Collections offer a core collection of Center publications free to the public, and their staffs are trained to direct patrons to appropriate resources on funding information. Many CCs also have directories and reports on local funders as well as copies of IRS information returns for private foundations in their state or region. For the address and telephone number of a Cooperating Collection in a given location, click on the hyperlink or call the Center at 1-800-424-9836.

Publications. The Foundation Center annually issues more than 60 publications, among them directories of foundation and corporate grantmakers, grants lists, research studies, bibliographies, and authored works on subjects relating to fundraising, foundations, and nonprofit management. All Foundation Center publications, including The Foundation Directory and The Foundation Directory Part 2, are available for free use in all Center libraries and Cooperating Collections.

A Sampling of Center-Issued Books

The 1997 edition of The Foundation Directory features current data on the nation's largest funders, those that hold assets of at least $2 million or distribute $200,000 or more in grants annually. The volume includes information on more than 7,500 major foundations, which hold combined assets of $170 billion and donate well over $10 billion annually.

The Foundation 1000 provides comprehensive, multi-page profiles of the 1,000 largest foundations in the United States. Profiles include grantmaker addresses and contact names, reviews of program interests, purpose and giving limitations statements, application guidelines, and the names of key officials.

The 1996 edition of the Guide to U.S. Foundations, Their Trustees, Officers, and Donors has current information on every active private grantmaking foundation in the United States — more than 37,500 foundations in all.

The 1995 edition of the National Directory of Corporate Giving offers information on more than 2,300 corporate philanthropic programs, including detailed portraits of over 1,700 corporate foundations and more than 600 direct-giving programs.

The 1996 edition of The Foundation Grants Index lists grants of $10,000 or more awarded by more than 1,000 of the largest independent, corporate, and community foundations in the United States.

The Foundation Center's Guide to Proposal Writing offers a comprehensive look at the steps involved in preparing an effective funding request and gives advice on such subjects as proposal formats, budget preparation, and follow-up

The 1996 edition of Foundation Giving: A Yearbook of Facts and Figures on Private, Corporate and Community Foundations, a comprehensive overview of the latest trends in foundation grantmaking, documents the growth of and changes in grantmaking from 1975 to the present..

Services. Whether they visit a Center library to find out about a foundation's giving guidelines, about recent changes at foundations in their region, or about grants in specfic areas of interest, people turn to the Foundation Center for information on the foundation field.

Fees. While many Center resources and services are available on a complimentary basis, for others a fee corresponding to the cost of online time or the amount of staff time required to fill a request is charged. For more information, please call or write the Foundation Center.

Referrals. Among the questions most commonly asked by novice grantseekers are: Which funders might be interested in my nonprofit organization or project? And, Where can I find information about proposal writing and other fundraising skills? The Foundation Center encourages people with these kinds of questions to call or visit a Center-operated library or Cooperating Collection, where staff trained in the funding-research process can help them get started.

Custom Research and Database Searching. Center staff also provide custom services ranging from photocopying to telephone reference to database searching. Staff consult with customers to identify their needs and determine the most cost-effective and timely way of obtaining the information they require. The Foundation Center's database contains comprehensive information on more than 40,000 grantmaking foundations and direct corporate giving programs. The contents of the Center's database are available to subscribers through DIALOG Information Services. Custom searches performed by Center staff are conducted using DIALOG files or the Center's internal database, depending on the nature of the information request.

Research Advice. When people wish to conduct their own research, they often call or visit the Center for advice on how to proceed. Center staff can recommend the best online and other sources of regional and national information, offering assistance in performing a variety of searches.

Foundation Center Main Office: 79 Fifth Avenue, New York, NY 10003-3076; (212) 620-4230

Field Offices:

1001 Connecticut Avenue, N.W., Suite 938, Washington, D.C. 20036; (202) 331-1400
50 Hurt Plaza, Suite 150, Atlanta, GA 30303-2914; (404) 880-0095
1422 Euclid Avenue, Suite 1356, Cleveland, OH 44115-2001; (216) 861-1933
312 Sutter Street, Room 312, San Francisco, CA 94108-4314; (415) 397-0902

Choosing a Computerized Test Development System

Diane M. Billings, EdD, RN, FAAN, Indiana University and Jane Kirkpatrick, MSN, RNC, Purdue University

FEATURES OF AND CRITERIA FOR SELECTING TEST DEVELOPMENT SOFTWARE

- User Needs/Goals
- Ease of Use
- Psychometric properties
- Scoring reports-grade books
- Word processing capabilities
- Screen design/layout
- On-line administration
- Security
- Platform
- Technical Support
- Cost

ISSUES TO CONSIDER WHEN USING TEST DEVELOPMENT SOFTWARE

- Ease of use of program
- Resources needed to use software
- Security of testing environment
- Ability to maximize opportunities to use text book testbanks

SOME TEST DEVELOPMENT SOFTWARE PROGRAMS

A+ Test Manager & Test Taker	LXR Test	MicroCAT	Question Designer for Windows (Question Mark)	Text Construction Set	Diploma
Professional Development Software, Inc. P.O. Box 2063 Chapel Hill, NC 27515 Phone & Fax (919)932-5013 Contact: Pat Brown/ Dennis Brown	Logic eXtension Resources 7168 Archibald Ave. Suite 240 Rancho Cucamonga, CA 91701-5061 Voice(909)980-0046 Fax(909)987-8706 www.lxrtest.com	Assessment Systems Corporation 2233 University Ave., Suite 200 St. Paul, MN 55114 Ph: (612) 647-9220 FAX (612)647-0412	**Presence Corporation 181 Grove Street Standord, CT 06913** Phone 800-863-3950 www.prsnce.com	Computer Training & Support Corporation Software Product Division 14115 Farmington Road Livonia, MI 48154 (800)884-2872 Fax (393)525-1401	Brownstone Research Group 706-802-1713

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- http://www.best.indiana.edu/quizsite/quickstart.html
- http://www.engr.iupui.edu/~dave/iq.htm
- http://www.formalsystems.com/frames.htm
- http://www.uiowa.edu/~itsisdg (section on test authoring system review)

Selecting and Using Computerized NCLEX-RN Review Programs

Jane Kirkpatrick, MSN RNC, Purdue University
Diane Billings, EdD RN FAAN, Indiana University

Introduction:

Students, faculty, and nursing schools are concerned about their success rates on the National Council Licensure Examination for Registered Nurses (NCLEX-RN). Since the inception of the computer adaptive exam, the number of software programs which allow students to practice their exam taking has increased dramatically. It is the intent of this presentation to discuss the criteria faculty may wish to use in evaluating these programs. Issues in using computerized NCLEX-RN software will also be discussed.

Types of Software Available

-Designed for purchase by a school of nursing to be placed on a network or designated computer
-Directly marketed to students
    disc only
    review book with a disc
-On-site computer-adaptive test with consultation

Criteria for Reviewing

-Program design and features
    feedback
    computer adaptive
    bookmarking
    references provided

-Questions in the item bank
    match with the current NCLEX-RN test plan
        nursing process
        client needs
        cognitive domain
        subject areas
    clarity of questions
    current practice reflected
    practice vs. test mode
    size of the item bank

-Question feedback
        information correct
        reinforcement
        coach/hints
        options to turn feedback on and off
            during exam
            end of exam

-Performance reports
    How is the report provided?
        on screen
        hard copy
    Pass point
    How are results categorized?

-Screen design
    Layout match NCLEX-RN design
    Key strokes match NCLEX-RN design

-Other concerns
        Technical support and documentation
        Meets platform and system requirements
        Warranty and Upgrade policy
        Price

Issues in Using Computerized NCLEX-RN Preparation Software

-What is the purpose?
- simulate the testing experience
- student diagnostic prediction
- program evaluation

- If used for diagnostic purposes
- Is student participation mandatory?
- relevance of the experience to the student
- timing and scheduling of test taking
- predictive value of results
- How is feedback shared with the students
- security of the exam

Some of the software available for NCLEX-RN Preparation

NCLEX-RN Success: The Advanced Q&A Approach
Meds, Incorporated
PO Box 4520
Silver Spring, MD 20914
(310) 622-9191

Compass-RN
Center for Nursing Education and Testing, Inc.
1973 Washington Valley Rd., Box 568
Martinsville, NJ 08836-0568
(908) 469-8615

Preparing for NCLEX-RN CAT
National Nursing Review
342 State St., Suite 6
Los Altos, CA 94022

HESI Assess Test
Health Education Systems, Inc.
1107 Hidden Coves, Suite #2
Point Blank, TX 77364
(800) 950-2728

NLN Practice Challenge
Pharmacology Test
Practice RN
National League for Nursing
350 Hudson St.
New York, NY 10014
(800) 669-9656

Medi-Sims Computer Assisted Preparation for NCLEX-RN
Williams & Wilkins
351 W. Camden St.
Baltimore, MD 21201-2436
(800) 527-5597

Mosby's NCLEX Review
Mosby-Yearbook
11830 Westline Industrial Dr.
St. Louis, MO 63146

On-Site Test Review
Arnett Development Corp.
P.O. Box 6326
North Augusta, SC 29841
(803) 279-6325

NCLEX 2000
Springhouse Corporation
1111 Bethlehem Pike
P.O. Box 908
Springhouse, PA 19477-0908

Building Blocks for Nursing
NSNA NCLEX EXCEL
Medical College of Pennsylvania & Hahnemann University, Division of Continuing Education
3300 Henry Ave.
Philadelphia, PA 19129
(215) 842-4091

EXAMCO
EXAMCO, Inc.
5728 Jefferson Highway
New Orleans, LA 70123-5513
(800) 934-6770

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Vital Signs: From Interactive Videodisc to CD-ROM

Julie McAfooes, FITNE

FITNE became a recognized leader in the development of interactive videodisc programs for nursing in 1989 with the release of its popular program, Intravenous Therapy. As the evolution of technology continued into the 1990's, FITNE kept a close watch on the advances made in digital video to see if any could match the excellent picture quality achieved by analog videodiscs. It wasn't until the advent of digital video in the MPEG format that FITNE decided in 1995 to create some of its programs in an all-digital format. MPEG digital video was not only close to the quality of analog video, it was also a standard that was supported by hardware suppliers and programming software.

A survey of the current FITNE IVD software inventory revealed that some titles were "timeless" in that they contained content that would remain stable for a long period of time. It was these titles that FITNE decided to convert into an all-digital formats. Sterile Technique on CD-ROM was released in 1996. It was a relatively simple program to convert. A few enhancements were made in its instructional design and the graphical interface was completely redrawn, but the basic structure remained. Next, FITNE decided to convert its popular Vital Signs program. This four-part program was much bigger in scope than Sterile Technique. A plan was put into place to facilitate more efficient conversion. This plan included:

1) Review of the original program to determine changes that might be needed in content. These changes were few but important. For example, universal precautions were updated to reflect the standard precautions now recommended by the CDC.

2) Review of the instructional design. Some changes were based on feedback received from the original program. Other changes occurred because of improvements in software capability.

3) Conversion of analog video to digital video. The original footage and master tapes were located. The frame numbers used for each scene in the program were converted to timecode numbers. Each segment was given a name according to a carefully-planned naming convention. Then the master tapes were encoded and named according to the plan. The naming convention allowed the programmer to work ahead of the digitizing effort, by using placeholders for digital video files. Several of the still frames were recaptured not from the master tapes but from the original source tapes. Important lessons that we learned is to keep meticulous logs of all footage. Never throw away EDL's (edit decision lists). And, of course, never lose any videotapes. Assets should be treated like the precious resources that they are.

4) New graphics were created to replace many of the old ones. The IVD version could only support EGA graphics. The CD-ROM format allowed a much higher-quality graphic. The demand on the graphic artists was much higher for the CD-ROM version. Original sources were located for some of the drawings and pictures and these were scanned. Some material was found in LifeArt's medical images. We also had pictures of people from PhotoDisc's collection. The graphics were named according the naming convention. Again, the programmer was able to work with placeholders while the graphics were created. One problem that was encountered during this phase was with shifting palettes. We set up a standard palette and all graphic images has to conform to this. Those that did not would not play properly on machines that had lower graphic capabilities. Some graphics were very time consuming to create and required close cooperation between the video and graphic art departments.

5) Programming was done in Quest, from Allen Communications. Much was learned from using Quest to program Sterile Technique, but there were many more challenges for Vital Signs. It was decided to complete Temperature first and take what was learned to develop Pulse, then Respiration and finally Blood Pressure. Part of the production for the last three programs overlapped.

6) Debugging was done on a number of machines with different configurations of hardware. Minimum standards for operation were established.

7) The user's guide was written. Packaging material was created. The master CD was sent to a production house that mastered the CDs, attached the CD labels, printed the user's guide, and printed the sleeve for the box that would house the program.

Each program in the Vital Signs series has become easier and faster to complete. The lessons that have been learned will be applied to future projects.

An Interactive Approach to Patient Education in the 90's

Susan Milligan, RN, MSN, CNS, Geoff Muntz MA, and Kristine Tischer, MA, DVM

Poudre Valley Hospital (PVH), a 235 bed tertiary medical center in Fort Collins, Colorado serves a largely rural area of the high plains and mountains of northern Colorado, southeastern Wyoming, and southwest Nebraska. Manyof the outlying areas view the full service hospital as an attractive alternative to the urban hospitals in Denver, just 50 miles to the south. Over the past few years, PVH has continued to see an increase in patient days despite predictions to the contrary. Administrators, however, cautiously await the encroachment of managed care into the area. As with most hospitals, PVH is attempting to minimize staffing adjustments and maximize the use of resources while maintaining a high standard of medical care.

A substantial portion of hospital revenue comes from inpatient and outpatient surgeries. Approximately 9,000 surgeries are performed each year at the hospital. Of these, 95% of the patients meet one-on-one with a preadmissions nurse for education prior to surgery. Each patient/nurse interview takes an average of 18 minutes. The Preadmission Program is challenged with a potential 33% caseload increase over the next year with minimal staff adjustment. Currently, 3.0 FTE's provide perioperative education for the Preadmissions Program. The ensuing challenge leaves the department asking... "Do we provide *less* education to *more* clients or the *same* amount of education to *select* clients?" The effectiveness of perioperative education at PVH was evaluated when the program was initiated seven years ago. The savings resulting from eliminating costly operating room delays more than justified the education and testing program expense. Staff knew that providing *less* education to clients would not be an effective solution to the problem.

How do we solve the problem?

The idea of computerized patient instruction was introduced to the department as an alternative to expensive nursing time spent repeating the same preparatory education. To meet the needs of the Preadmissions Program, the computerized education must meet two essential goals: 1) provide effective education, and 2) minimize time spent in the nurse/client interview. A review of the literature clearly documented the benefits and effectiveness of computerized patient education.

A team consisting of nurses, patient educators, media/computer specialists and a statistician was assembled to identify and discuss how computerized education could be integrated into the existing program. Their desire was to find a program that would deliver the same basic information routinely provided by the nurses. They didn't want to eliminate or replace the role of the nurse educator, but rather to make better use of the time spent with the individual patient. The search for a program to purchase was unsuccessful, as most of the existing programs were focused on a specific disease or condition. It was decided to investigate the feasibility of developing our own program.

Several factors were considered in our analysis: 1) level of available expertise within the organization for program design, 2) authoring software cost, 3) equipment needed to run the program, 4) content experts within the organization, and 5) support from hospital information Systems Department. We were unable to utilize in house resources for program design due to time constraints of hospital information systems staff. A local computer specialist was contracted to assist us.

Acquiring Administration Acceptance.

A thorough proposal including a detailed analysis of project costs and related savings was presented to administration. The proposal clearly demonstrated the recovery of the initial $10,000 development investment within the first year through salary savings. An additional selling point was the potential to extend the program to our outlying and rural customers through online education. This was especially attractive to administration as approximately 35% of surgery patients served at PVH come from outside the city of Fort Collins.

Program Development

A script was developed from taped recordings of actual client interviews to determine what common information was given to all patients. Input was also sought from the physicians in the anesthesia department. A draft narrative was written that would appeal to a broad range of client ages, capabilities and literacy levels. A story board approach was used to diagram the proper sequence and flow of

information. The team recommended the use of simple graphics and digital images of rooms, equipment and personnel to illustrate key concepts and acquaint the patient with the situations they would encounter. This would also serve to hold the interest of the clients during the education session.

Design Considerations.

Authorware Professional was chosen for the software development of this patient education program for several reasons.

1) The professional expertise to design the program using this authoring tool was immediately available.

2) The project required rapid development and presentation guidelines; the expertise combined with the software allowed for immediate development of the program.

3) Authorware Professional is capable of meeting the following needs as established by the development team:

- Built-in testing capabilities with individual patient evaluation printouts
- Continuous statistical compilation
- Easily adapted for use on the Internet and PVH Home Page; this will allow for future use by patients from outlying areas thus preventing extended travel time
- Compatibility with software and hardware in use by PVH Information Systems
- Easy revision and reconfiguration of the program to meet changing needs of the medical center and the various developers of the program
- Display and development of programs on either MC or PC platforms
- Allows for integration of multimedia components through the use of graphics, digitized photographs, video clips, sound clips and text, all accessible though computer branching design techniques
- Run-only capabilities allowing for distribution on CD-ROM

4) Multimedia techniques are valuable in adult education settings by addressing various learning styles.

Implementation

Many refinements were made to the program before it was ready to present to staff. The importance of visual appeal through graphics and animation was obvious. A formative evaluation was performed by clinical and non-clinical staff and further revisions made before the program was piloted with patients. The pilot has, spanning several months, includes 300 to 400 patients. All patients are encouraged to use the computer education module. Two computer carrels are arranged in a private, remote corner of the surgery preadmissions waiting area. Patients can review the education module at their own pace. A receptionist is close by to assist as needed. A touch screen is used instead of a keyboard or mouse to reduce computer anxiety. A pad of paper and pencil are available next to the computer should the patient have a question to write down for the nurse. All patients visit with the preadmission nurse after viewing the program.

Evaluation.

The program has a built-in evaluation mechanism to assess the patient's understanding of the information. This is accomplished by providing a multiple choice quiz at the end of the presentation. Quiz results are available to the nurse for each patient, as well as the amount of time it took to complete the education module. This feedback allows the nurse to reinforce or review only the necessary basic information, leaving more time to spend on individual client assessment and counseling. Those clients who do not receive computerized education are asked to answer the same questions as those who complete the computer module. To determine whether the program is effective we will evaluate and compare pilot results for both groups looking at: 1) correct answers to questions, and 2) time spent with the nurses. Once we determine the effectiveness of the computer education, we can prepare for Stage II of the project in which clients will be allowed to view the program without follow-up interviews with the nurse. A long-range goal of this program is to place surgery preparation education online for use by outlying areas, thus preventing extended travel time to the hospital for education.

Comprehensive Health Enhancement Support System (CHESS): In-Home, Computer-Based Patient Education and Support

Eric Boberg, PhD, University of Wisconsin-Madison

Introduction. CHESS (the Comprehensive Health Enhancement Support System) is a computer-based support system designed to remove or reduce barriers to the information and support needed by people facing health related crises or concerns. These barriers include distance, education, finances, ability to act under stress and concern for confidentiality or anonymity. CHESS, used in the home, can provide information and support that is convenient, comprehensible, timely, non-threatening, anonymous and user-controlled.

CHESS Design. CHESS is designed as a "shell" of integrated services, into which content on any topic can be easily programmed. CHESS is designed to be user-friendly, even to complete computer novices. A graphical interface provides easy-to-understand prompts. Color and pictures are used to highlight key information. A pop-up dictionary explains unfamiliar terms. A suggestion box allows easy feedback of users comments to the developers. CHESS is installed on personal computers placed in each user's home. A 30-45 minute tutorial is all that most users need to fully understand how to use and benefit from CHESS. CHESS is composed of a wide range of information, communication and analysis services, including:

Questions and Answers A compilation of answers to many common questions in each topic. Answers are brief 1- to 5-screen overviews, with references to where more detailed information can be found.

Instant Library A database of articles, brochures and pamphlets. Articles cover a broad range of topics and levels of complexity, drawn from scientific journals, newsletters and the popular press.

Getting Help/Support A tutorial which helps users understand what health and social services are available, how they work, how to find a good provider and how to be an effective and active consumer.

Referral Directory A database of national resources and services that offer information, support and referrals.

Personal Stories Real-life accounts of living and coping with health crises. Stories were collected and written by trained journalists. Users can read 300-500 word overviews, and more detailed "expansions" on specific topics.

Ask an Expert A private electronic mail service which allows users to ask experts anonymous questions and receive confidential responses within 24 hours.

Discussion Group An on-line support group which allows anonymous, non-threatening communication among people facing similar crises or concerns. Users share information, experiences, hopes and fears, give and receive support, offer different perspectives on common issues. Trained facilitator monitors groups to keep discussion flowing smoothly.

Assessment A series of programs which help users assess their lifestyle risks and patterns of behavior, and gives them feedback on dealing with these issues.

Decision Aid A program which helps people think through difficult decisions. Users learn about their options, clarify their values, the consequences of their actions, and any misconceptions they have.

Action Plan A program which helps users implement new decisions. It asks users how they propose to implement a decision, helps them analyze their strengths and weaknesses, supports and barriers, predicts the likelihood of success and suggests ways they can strengthen their prospects.

Dictionary A listing of easy-to-understand definitions of health-related terms.

Health Charts A program which allows patients to record their health history, track changes in their well-being, and link to material in CHESS that might help address specific concerns.

Link to Grateful Med® (HIV module only) Allows users to search the AIDS-related databases of the National Library of Medicine using their search program, Grateful Med®.

CHESS topics which are complete or under development include AIDS/HIV Infection, Breast Cancer, Adult Children of Alcoholics, Sexual Assault, Academic Crisis, Stress Management, Parents & Partners of Alcoholics, and Heart Disease. CHESS operates on IBM-compatible personal computers, which can be placed in users' homes or in community sites. The minimum individual work station requirements are a 386 microprocessor, 640KB RAM, 40 MB hard disk drive, color VGA monitor and a 2400-baud modem. Communications are transmitted via modem to a "host" computer (also a PC) with multiple modem connections.

CHESS Use and Impact

Use of CHESS services has been extensive in all studies to date. Several factors of note:

Acceptance Nearly 80% of all patients offered CHESS accept it.

Heavy Use In one HIV/AIDS study, over an average of four months, subjects used CHESS an average of once a day for a total of 39 hours over the course of the study. A high percentage of uses come between 10:00pm and 8:00 am, when few other services are available.

Social Support The social support services of CHES (Discussion Group, Personal Stories) account for up to 80% of all uses, though all services were reported by users to be extremely valuable. This demonstrates the power of computers not only as an information tool, but as a tool for communication, social support and problem-solving.

Used by All Demographic Groups Several studies of CHESS have demonstrated that age, education, minority status and socioeconomic status are not significant factors in CHESS use. While patterns of use may vary between different groups, overall use has been similar.

CHESS is one of the only consumer health informatics programs for which controlled evaluation research has documented positive outcomes. CHESS has demonstrated positive effects in a number of domains:

Quality of Life CHESS has shown positive impacts on several aspects of quality of life in studies on both the HIV/AIDS and breast cancer modules, including fatigue, cognition, social support, social activity and participation in health care.

Health Care Costs In a three-year clinical trial of men and women with HIV infection, subjects with access to CHESS had significantly fewer hospitalizations and average lengths of stay than subjects without CHESS. CHESS users also spent significantly less time with clinicians during their outpatient visits.

Enhanced Compliance with Treatment In a study of adult children of alcoholics, attendance at psychotherapy sessions improved dramatically when people had both psychotherapy and CHESS.

The Future of CHESS. Like any successful program in this age of information, CHESS will keep evolving. Future CHESS efforts will focus on five different areas:

Conversion to the Internet The rapid expansion of the Internet and the increasing availability of network computers have made Internet dissemination of CHESS not only practical, but also the least expensive and logistically difficult means available. All CHESS programs are currently being modified to be Internet-enabled, allowing platform-independent access. This conversion is expected to be complete by late 1997.

Expansion of Topics Existing CHESS topics only begin to cover the wide range of health care concerns facing us. A major goal of the CHESS project is to develop modules that cover the illnesses that result in 90% of the health care expenditures in the United States. Modules on prostate cancer, asthma, diabetes, etc. are already being planned. Many others will follow.

Expansion of Services Current CHESS services offer patients the most comprehensive set of tools now available in a single consumer health informatics program. Adequate management of many health concerns often requires significant behavior change, and much could be added to CHESS to support patients in this. Currently, we are designing new programs to better meet the needs of patients at all stages of behavior change, and integrating these new services into existing CHESS content.

Greater Links to Health Care Providers Patient-provider communication is essential to a shared decision-making model of health care management. We are currently investigating ways in which patient-provider communication can be enhanced and expanded, giving both parties more complete information on which to base treatment decisions.

Dissemination Ultimate success of CHESS will depend on widespread dissemination. A growing number of health care providers around the U.S. and Canada are using CHESS with their patients. Internet availability will increase ease of dissemination, and we look forward to dramatically increasing the number of patients with access to CHESS in the coming months and years.

Conclusion

CHESS integrates the best features of computers and human support. It:

- combines information, social support and problem-solving guidance into one system, making use more likely and rewarding;
- makes computer-technology attractive and easy to use for computer novices;
- presents high-quality, well-organized, detailed health information in language that is comprehensible to people at all educational levels;
- expands traditional boundaries of computers to include women, older people, low income people, people with less education and minorities; and,
- closes the knowledge gap for minorities and women. Because they often have less access to traditional sources of information and support, underserved populations find CHESS to be very helpful and use it heavily.

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Kaiser Permanente Online: Managed Care Meets Cyberspace

Fran Carl, MPH, Interactive Technologies Initiative, Kaiser Permanente

Imagine being able to research health conditions, complete a personalized Health Risk Assessment, get advice from an online clinician, request appointments, and renew prescriptions with the click of a mouse. Kaiser Permanente Online is an interactive members-only World Wide Web site that provides a variety of health care services to Kaiser members. Kaiser Permanente Online began testing in October 1996 with 1,000 members in Northern California.

Kaiser Permanente Online currently provides health information (e.g. self-care information from the Healthwise Knowledgebase®, Kaiser health education pamphlets, medication information from the USP®), information about Kaiser products, providers, and medical facilities, information about health education classes, and topic-specific discussion groups. In addition, Kaiser Permanente Online offers private email questions to an advice nurse and a pharmacist, and a more public question and answer forum with Kaiser clinicians such as a pediatrician and a sports medicine physician.

Kaiser Permanente Online has the capability to store and transmit member heath information, such as Heath Risk Assessment data. The system is being developed with many security safeguards (including the use of a Personal Identification Number PIN) to protect the confidentiality of member medical information. Other security measures include technical safeguards such as passwords, encryption, and firewalls, as well as detailed policies, procedures, and training.

Kaiser Permanente Online will be the basis for an integrated, interactive health care delivery system. In the future, this product will include the capability for disease management and customized, member-specific information. For example, a diabetic member will be able to transmit glucose self-testing information to his/her clinician and then receive personalized diabetes management instructions and tips for self-care. This will result in more knowledgeable members, more appropriate utilization (including urging members who should be seen by their physicians to come to for visits), and better use of the office visit encounter.

Online services are one more option a member may select, not a requirement. Many members prefer to use their computer to contact Kaiser Permanente instead of using the telephone or traveling to a facility. Kaiser Permanente Online does not reduce funding available for direct patient care. Rather, it is an investment in the future. While the products may not show a significant return on investment for a few years, we expect it to be a wise investment and we will monitor the pilot studies closely. Kaiser Permanente Online was developed in response to member and purchaser requests. Having access to Kaiser Permanente through their computers at home or at work provides members with a convenient new option to access health care information and services day or night.

While Kaiser continues to refine and develop this product, users have provided constructive feedback about the product as well as the overall concept. A survey of 1,000 members who were sent PINs revealed that 78% rated the idea of being able to access Kaiser Permanente on the Internet as a good idea. More than four in five of members returning survey questionnaires said they either definitely or probably would use Kaiser Permanente Online. Users have provided constructive feedback about ease-of-use of the site navigation and the user interface, and usefulness of the content. Three-fourths of users rated Kaiser Permanente Online as being very or somewhat useful and nearly two-thirds of users said they were very or somewhat satisfied with Kaiser Permanente Online overall. Most users cited their primary reason for logging on was To see what was available on the site, but over one-fourth cited their primary reason for logging on was To get specific health-related information. Other findings include:

- Nearly two-thirds rated the system as being easy to use,
- Over half said that in general they were able to find the information seeking,
- Nearly half rated Kaiser Permanente Online as better than most sites,
- Over one-third have discussed Kaiser Permanente Online with family or friends.

An important feature added to Kaiser Permanente Online in 1997 is the addition of online support groups. Some of these groups are moderated by Kaiser clinicians and others are peer moderated. Online support groups offer members with special needs, such as members with chronic illness or their

family caregivers, the ability to share information, manage expectations, receive support, and socialize without the inconvenience of traveling to a medical center or other meeting place. Initial member response is positive, regarding both Kaiser Permanente Online and Kaiser Permanente in general.

Kaiser Permanente Online will evolve over time, with ever-increasing functionality. Our goal is to offer health information and health services in a way that offers convenience and flexibility for members. In 1997 and 1998, Kaiser Permanente Online will become available to members with Internet access throughout Northern California. Also, during 1997 and 1998 Kaiser Permanente Online will be tested at locations in three other Kaiser Permanente regions: Mid-Atlantic States, Northwest, and Southern California. As we add more users and more features to Kaiser Permanente Online, we will continue to evaluate the service to determine how Kaiser Permanente Online impacts member access and quality of care.

Supporting Interactive Education: Constructing a Full-Service Resource Center

Jim Duncan, MLIS, University of Iowa

As traditional and digital resources meld, health sciences libraries have shrugged away that constraining stereotype of "storehouse" in favor of a more dynamic image. At the University of Iowa's Hardin Library for the Health Sciences, a newly-constructed facility called the Information Commons serves as a generational step in this evolution. It is an intersection: a place where on-line access, creation of digital resources, and innovative teaching arrive at a single point. As a common ground for self-directed learning, information research, hands-on class sessions and multimedia development, the Information Commons extends the library's role among the university's health sciences colleges, in addition to complementing and building upon the library's more traditional educational resources and services. In the Information Commons, faculty, staff, and students access or use:

- health sciences databases and other electronic resources containing text, images, sounds, videos, and numerical data;
- authoring tools and software to create multimedia courseware, including the ability to distribute such products using the World Wide Web;
- computer-based learning (CBL) products developed at the University of Iowa and other academic institutions, or available commercially.

The Electronic Classroom

A trend throughout the University of Iowa's health sciences colleges is the integration of more case-based or problem-based learning into areas of the curriculum. One efficient way to deliver case-based education is to use CBL resources, either network-based or on CD-ROM. The Information Commons is a central delivery point for a variety of services and electronic resources related to case-based education, including: access to core biomedical literature and other types of databases; multimedia CD-ROM products; web-based resources; case and simulation software; and QuickTime Virtual Reality (QTVR) creations.

An electronic classroom located within the facility is perfectly suited to such activities. The classroom provides instructors with high-quality projection capabilities, audio-visual equipment, and a stereo system. With the capacity to seat 50 people at 25 workstations, the networked classroom is used primarily for interactive, hands-on teaching by health sciences faculty, librarians, and other professionals at the University of Iowa. It also serves as an ideal setting for continuing education sessions.

The classroom's hands-on capabilities provide an opportunity for greater interactive learning, but require that faculty members recast their teaching approaches. In such an environment, instructors lecture less and facilitate more, guiding students as they think through problems and pursue logical connections during the educational process. The Information Commons eases this transition to new methods of delivering education by providing a variety of consultation services and the technical infrastructure to support both instructors and end-users.

Following its opening in August 1996 and its two initial semesters of operation, lessons were learned about access, security, and staffing, amidst many successes and a few rough spots. New initiatives for providing expanded resources and access points to campus users, along with continuing modification of facility services, currently are being discussed and implemented with a goal of matching users' future needs.

Knowledge management

The idea of hospitals and clinics as physical places where healthcare services are delivered is shifting. A virtual hospital, where services are delivered, a wealth of information is available, and timely continuing education of both the healthcare provider and patient can occur, is not an unreasonable future. In a world where medical information expands alongside rapidly-shifting technology, however,

both health sciences students and practicing professionals are called upon to manage the flood without being given adequate tools or training. In the Information Commons, health sciences students learn information retrieval and information management skills. By learning broad techniques and becoming comfortable (or even skilled) with the shifting technologies, students will be able to apply the information appropriately in their future clinical or research settings. The promotion of lifelong learning doesn't end with current students, however. Continuing education of health professionals is becoming increasingly highlighted among the educational goals of the health sciences colleges, with the library's offerings and outreach activities dovetailing into those pursuits.

Campus Leaders

Construction of this library-based facility did not occur in isolation. Cooperation on funding and planning resulted from the formation of unique partnerships between administrators, faculty, librarians and other staff members. Such partnerships continue to be sought and formed through the efforts of Commons and library staff, along with ongoing input and support from a health sciences faculty and staff advisory group. On a programmatic level, both Commons and library staff are directly involved with the development and delivery of: case-based approaches to learning; multimedia-based curriculum materials; computer-based testing; and informatics topics integrated with specific health sciences courses. The sudden success of the Information Commons and the increased visibility of the health sciences library has resulted in ground-level involvement by librarians in technology and classroom planning for a new $60 million medical education and research building. The facility's impact on the health sciences campus has sparked the construction of an additional multimedia classroom within the anatomy department, along with a new proposal to create an expanded information technology area and networked classroom adjacent to the current facility.

The Information Commons is located next door to the Telemedicine Resource Center on the second floor of Hardin Library for the Health Sciences. During the fall and spring semesters, it is open seven days a week, including nights and weekends. The facility was funded in part by funds from the UI College of Medicine, the UI Libraries, the Roy J. Carver Charitable Trust, and the Student Computing Fee Advisory Committee. For more information about the facility, its developments, or its support structure, see the Information Commons web site at http://www.lib.uiowa.edu/commons/.

Developing Assisted Self Directed Learning (ASDL) Modules for Hospital Staff Development

Susan Boyer, RN, Valley Regional Hospital

ASDL is a structured, self-paced educational module that includes written material, resource text, worksheets, video presentations, computer assisted instruction, module posttests, and a course facilitator. The materials used are written by professional nurse educators, thus the quality and presentation of information are optimal. The use of multiple media produce repetition of the core content and meet the demands of a variety of learning styles. Repetition increases the level of retention, especially as the content is received through different senses and the learner interacts with the information. The computer assisted instruction (CAI) provides a safe non-judgmental environment for decision making and application of critical thinking skills.

This type of learning module provides the greatest degree of flexibility in both content focus and scheduling of work/education time. The learner starts at their point of need and can move quickly past content that is familiar. If they have questions or lack understanding in other areas, the content can be repeated as needed. Study and learning time can be spent independently, as the videos and CAI are available for sign out. The student can study in 2 or 3 hour blocks of time in the setting of his/her choice. The electronic and text media ensure consistency of information given, as well as providing an ongoing resource for learning. When the learner completes the course, he/she can still return to access and review information from the learning resources.

A course facilitator is key to the successful completion of the course. Many students need the structure that is provided by outline, objectives and a teaching plan. These provide consistency, guidance and the opportunity for independence for the learner. The facilitator is available to teach media use, assist with problems and to find answers to any questions which might arise. These learning modules may also include skills acquisition which may require tutoring, precepting, and competency verification. The facilitator works with the learners one on one or in small groups. Thus the quality and quantity of learning is greatly enhanced. The clinical specialist is freed from classroom lecturing, to spend more time assisting the student with skill practice and clinical experience in the work setting.

The interactive technologies are the 'workhorse' that feeds information to the student. It stimulates student involvement, interaction, and development of critical thinking skills. We have successfully developed and implemented an ASDL Critical Care Course that has become the regional resource for Critical Care Training. We now use this teaching style for many courses and for crosstraining modules. The student (and manager) feedback has been very positive and rewarding. Through use of these technologies, ASDL provides educational opportunities that are comprehensive, effective, flexible and readily available to the learner.

Assisted Self-Directed Learning -- Outline

Traditional approach

Advantages over traditional teaching methods
- professionally written and published materials
- consistency
- availability
- flexible use/scheduling
- multiple users at varied places
- varied media meets - varied learning styles
- safe environment for critical thinking and skill practice
- repetition = increased learning
- non-judgmental learning environment

Describe the content of a ASDL module
- Resource text, study guides, video, CAI, tests
- using tests as learning tools!!

Identfy the steps in creating a module
- ID need/subject/content area
- Objectives of program
- Preview and evaluate resources

Developing a teaching plan
- Implementation
- Evaluation

For example:
- Critical Care/Basic Dys/IV Therapy
- Cross Training Modules for Med/Surg, Pediatric, Emergency Dept., and Maternity

Integrating Essential Anatomy into a Physiology Course with A.D.A.M. 3.0

William J. Higgins, University of Maryland at College Park

In all of biology, and especially in physiology, function derives from structure. In many curricula, students study anatomy (i.e., the structure) and physiology (i.e., the function) in different courses. In these courses, important structure - function relationships may not be emphasized by the faculty or identified by the students. Introduction of essential structural features into a series of physiology lectures provides an intellectual framework for understanding the function and regulatory mechanisms of the organs and tissues of the human body. *A.D.A.M. 3.0 Interactive Anatomy* software is an effective, easy to use tool that facilitates this process. This software includes a powerful authoring tool that I am utilizing to create customized presentations for lecture, laboratory, and out of class self-study situations.

Introduction

Physiology is divorced from anatomy in many undergraduate and graduate biology programs. In most curricula, the two subjects are taught in different, unrelated courses. In other programs, many of the graduates complete a human or general physiology course but never take any human or mammalian anatomy. Since structure derives from function and a knowledge of structure provides a basis for understanding function, the lack of integration of these two subjects often reduces students' understanding of the physiological processes.

While adequate coverage of essential anatomy is desirable in a human physiology course, a rapidly growing body of knowledge and the need to emphasize the cellular aspects of the subject minimizes the time available for an exploration of even the most basic anatomical features. I have found that *A.D.A.M. Interactive Anatomy* provides an effective tool for introducing the anatomy as an integral part of the lecture material in my upper level mammalian physiology course at UMCP. More importantly, it allows me to create a series of integrated anatomy and physiology exercises for student review outside of class. Other modules produced with images from A.D.A.M. and from my own collection provide important reference materials in the laboratory.

Software, Hardware, and the Course.

A.D.A.M. Interactive Anatomy (version 3.0) was purchased from A.D.A.M. Software, Inc. (Atlanta, GA). Graphical images and line art were produced with ClarisWorks (Claris Software). All software programs were run on a Power Macintosh 7100/80 computer with 32 MB of RAM.

In Spring, 1997 at UMCP, 271 students enrolled in Mammalian Physiology (ZOOL 422) and 140 of these students also enrolled in Mammalian Physiology Laboratory (ZOOL 423). These students previously completed the prerequisite organic chemistry and sophomore-level introductory cell biology courses. Only 28 of the 271 students in the lecture course (ZOOL 422) had ever completed a course that included any significant coverage of mammalian anatomy. At the conclusion of the course, over 85% of the surveyed students felt that some ancillary coverage of anatomy would have been beneficial.

Instructional Modules

In an effort to meet the need and demand of my students, I am constructing a series of modules that will be used in both lecture and recitation. Each module will:

- be constructed with the Slide Show feature of A.D.A.M. Interactive Anatomy;
- utilize original graphical images and line art drawings
- incorporate relevant A.D.A.M. anatomical images;
- be available for student review in the computer laboratory.

The first module, described below, was recently reviewed by former ZOOL 422 students. Their comments form the basis of my initial, subjective evaluation of this approach.

The first module, titled *The Efferent Peripheral Nervous System*, provides visual images that support the lecture during the first two weeks of Mammalian Physiology . The purpose of this section of the course is to provide essential background information on one of the two major effector systems that exert

homeostatic control of the organ systems. The other homeostatic effector system, the endocrine system, is covered in subsequent sections. In addition to the pharmacology of the somatic and autonomic (sympathetic and parasympathetic) nervous systems, the anatomical and functional features of each are compared and contrasted. The students are expected to understand that certain structural features of each give rise to important functional properties.

The unit begins with a simple description of the structural features of the somatic, parasympathetic, and sympathetic nervous systems. My own line art renditions capture and emphasize some important features. However, the A.D.A.M. images allow me to present realistic images in different formats, including colorful illustrations rendered from anterior, posterior, and lateral views and photographs from cadaver dissections. The Atlas Anatomy feature of A.D.A.M. also includes several stylized renditions of the nervous system and innervated structures that the students found especially useful.

In subsequent lectures, I present the function and pharmacology of the parasympathetic and sympathetic branches of the autonomic nervous system. The ability to supplement my own charts and tables with high quality A.D.A.M. images attaches the concepts to anatomical structures and increases the students' sense of relevance. The diagrammatic representation of organs innervated by various autonomic nerves and the highlighted images of the various nerve pathways taken from A.D.A.M. greatly enhance the quality and effectiveness of the presentation.

These same images supplemented with text will be available for review by students in the computer equipped study room assigned to the course. This text will include explanations, directions for exploring the "dissectible anatomy" images within A.D.A.M., and questions for review.

In summary, I find that A.D.A.M. Interactive Anatomy allows me to integrate anatomy into both the lecture and recitation portions of my course. The authoring tool is easy to learn and use and enables me to create high quality, effective presentations. More importantly it allows me to incorporate anatomy and the structure - function relationships into my physiology course.

It's Not How Much It Costs; It's How Much It Saves! Justifying the Cost of CBT to Your Organization

Jon Rosen, MPH, Graphic Education, Inc.

Fifteen years ago, education departments were often accountable only for the number of programs and participants (Process Analysis). As the Quality Movement gained steam in the last five to ten years, we focused on the effect of our programs (Impact Analysis). Now, as resources shrink and training needs grow, we struggle to prove the efficiency of our programs (Economic Analysis). While computer based training (CBT) can get the most "bang for the buck", we are intimidated by high startup costs. This is a summary of the program planning and evaluation tools that will help you make a business case for CBT.

Process Analysis: Need, Reach, Coverage, and CostThese tools allow you to see how different training formats affect program attendance or compliance. They then become the basis for our later impact and economic evaluations.

Need: the potential audience for your program. It may be obvious (all the RN's in your organization, for example); or more abstract (as in the audience for this conference). Need remains the same regardless of training format.

Reach: the number that attended, or that you estimate will attend, your program. Your comparisons or estimates of attendance will widely vary according to training format and are influenced by the political, technological, and social climate of your organization. CBT has a potentially far better Reach than other formats, as participants use the courseware in off shifts, weekends, staffing downtime, and even at home.

Coverage: Reach / Need x 100 (Reach divided by Need multiplied by 100). This is the percentage of your audience that attended (or that you estimate will attend) the program.

Impact Analysis: Impact, Efficacy, and EffectivenessThese tools allow you to measure results, or estimate results during program planning.

Impact: How many attendees "got it." That is, of those who attended, how many achieved the program outcomes. A difficult evaluation point, impact is most often measured in terms of learning outcomes; it is only a very rough estimate of how the participant will perform in the real world.

Efficacy: Impact / Reach x 100. This is a measure of how effective your program was on those who attended. It is the percentage of attendees who "got it"; it is known as "effectiveness" in the vernacular.

Effectiveness: Impact / Need x 100. This percentage incorporates your total audience (all of those in need of the program) into your analysis. Example: One-on-one counseling is an Efficacious format, but if you reach only 10% of your audience because of it's high cost, it is not an Effective format.

Economic Analysis: Cost, Cost Effectiveness, Value, Benefit, and Cost BenefitThese show that you've achieved your results at a reasonable cost. They are your planning tools for choosing among different teaching formats.

Cost: the total amount of all program costs during the length of your evaluation period. One-time and startup expenses should be amortized (spread out) over the life of the entire program. If you are evaluating a program over a six month period, but you plan to offer the program for one year, you should only include 50% of the startup expenses in the Cost (six months is 50% of the one year program).

In addition to program design and coordination expenses, Cost includes participant expenses such as wage estimates, travel, and staffing replacement costs. CBT will cost far less in these areas, and the disadvantage of CBT's high startup expense disappears as Reach and program shelf life increase.

Efficiency: Cost / Reach. This measures how much you spent for each attendee. If Reach and Impact are the same, Efficiency will be the same as Cost Effectiveness.

Cost Effectiveness: Cost / Impact. This is the cost per effect; the amount of money you spent on each participant that "got it." It is the most important measure of program efficiency in the absence of any measurable Value (See the next item).

Value: the program's monetary value per participant. This is necessarily a guess, whether in the planning or the evaluation stage. Example: the financial impact of a program that trains nurses to use a skin dressing that reduces healing time. The Value is the money saved on each patient for whom that nurse uses the new skin dressing.

The Value of many programs is such a bald estimate that it may be silly (or controversial) to hazard a guess. What is the Value of your JCAHO mandated confidentiality training, for example? In such cases, you may prefer to leave Value blank, and end your economic analysis with Cost Effectiveness.

Benefit: Value x Impact (Value multiplied by Impact). Benefit is the program's total monetary value.

Cost Benefit: Benefit / Cost (the result is expressed as a ratio such as $10/1, which means $10 of benefit per $1 of cost). Cost Benefit allows a standard for comparison between training formats - Dollars of Benefit per $1 of Cost. Here is your strongest evaluation tool because it combines effectiveness and efficiency in one standardized measure.

Summary: The Business Case for CBTThe broad profile of a program that can be delivered more efficiently with CBT: large audience and high Coverage requirements; long program life; and short program length. The classic examples are the JCAHO mandatories that require >90% Coverage for an entire organization's staff, run perpetually, and often are completed during staffing down-time. As you experiment with these calculations (See the spreadsheet instructions below), you'll see that nearly every program with a large audience and long shelf life may be a good candidate for CBT.

CBT is an efficient training and education format. High startup costs are offset as the number of participants (Reach) rises. This is increasingly important as we provide more training with fewer resources. The tools described here allow an easy approach to analyzing and comparing the efficiency of different training formats; these analyses can then can serve to justify implementing CBT in your organization.

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Automate Your Evaluation with a SpreadsheetSet up a spreadsheet with cells for the following inputs: Need, Reach, Cost, Impact, and Value. And, using the formulas provided above, create cells for the following calculations: Coverage, Efficacy, Effectiveness, Efficiency, Cost Effectiveness, Benefit, and Cost Benefit. As you change the inputs for different training formats, note their varying impact on Cost Effectiveness and Cost Benefit.

This spreadsheet is also available on the World Wide Web at www.graphiced.com/justifycbt.htm

Extending Your Educational Reach with the Internet

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The Internet's history goes back many years, although its application to healthcare is just beginning to blossom. Some estimates project that over 40 million people currently use the Internet. Certainly, some of those users are patients and a growing number are healthcare professionals. The purpose of this presentation is to provide a snapshot of how Internet technology is being adopted by the continuum of healthcare, but more specifically for education and professional development. Findings will be presented from some recent research with students, educators, practitioners, and institutions. The impact of electronic commerce, electronic data interchange (EDI), the World Wide Web, listservs, newsgroups, push technology, and other Internet-related tools on education will be covered.

Factors Slowing Adoption

As highlighted by a recent report by Ernst & Young, six out of ten healthcare institution respondents had no articulated Internet strategy. The study indicates that the adoption of the Internet by healthcare has been hampered by many factors: concerns for data security and confidentiality, lack of clear regulation, difficult financial justification, and the relatively low level of interest in information technology by healthcare institutions in general. Nevertheless, adoption is beginning to grow as institutions and professionals learn more about its potential. The growing volume of attendees at conferences such as Interactive Healthcare97 indicates the timely realization of the value of technology to professionals and organizations in healthcare.

Organizational Model vs Professional Model

The impact of the Internet on healthcare and education can be viewed in two distinct models: one which defines the organizations providing the care, and one which defines the professionals providing the care to diverse patient populations. Both models are addressed in this presentation. Those organizations that understand the Internet and have the creativity and foresight to use it for educational purposes and, of course, for improved information flow are just beginning to recognize significant advantages. Information flow among diverse healthcare providers is being consolidated by managed care, thus forcing key modifications in processes and coordination among healthcare provider organizations and professionals. This, coupled with key advancements in technology, is quickly eliminating the many existing concerns relating to the adoption of Internet technology. Furthermore, institutions will soon not be able to afford to ignore such technologies.

Healthcare professionals are gaining access to the Internet through both their institution and personal connections from home. Those who learn to use it will learn how to advance their organizations in a highly competitive playing field, and, at the same time, gain key skills and knowledge that can serve to enhance their career. To begin the process of evaluating specific Internet materials, we will provide several interesting examples of how practitioners, staff developers, educators, and managers alike can extend their reach and dollars through an array of online nursing and medical educational resources. We still also examine innovative examples of Internet use in general education that can be applied to the challenges we face in healthcare.

Additional Resources

Due to the high growth and constant change in Internet addresses, a list of resources is not provided with this paper. Instead, an electronic list, updated at the time of the Interactive Healthcare 97 conference, is posted on Springnet, Springhouse Corporation's Web site at http://www.springnet.com/ihc97.htm. This list emphasizes practical solutions that organizations and individuals are already beginning to use with success.

Incorporating Virtual WWW Active/Collaborative Learning Modules in Nursing Education

Kathleen Mastrian, RN, PhD and Dee McGonigle, RN, PhD

Collaborative learning activities are changing the way we teach and interact with our students. This presentation will demonstrate the use of active and collaborative learning activities by showcasing the authors' technology based learning modules for three different types of courses, an RN Transition course, an advanced medical nursing course, and a nursing research course. Featured activities include WWW searches, critical thinking activities, problem-based learning, and concept mapping. Design, preparation, implementation and evaluation strategies will be discussed. Student perceptions of the advantages, disadvantages, effects on learning, and overall experience with the innovative learning strategies will be shared.

Cyberspacial Quests

The first site explored will be the History of Nursing and Nursing Education page. This site guides students on a scavenger hunt for information through cyberspace. The students surfed the Internet for the necessary bits of data related to either history or education. The students learned how to navigate through this vast cyberspacial information junkyard in search of those meaningful morsels of data. Once they reached a worthy morsel, they had to extract the site information and store it away for future recall. The scavenger hunt required the students to not only retrieve the information but also post the URLs electronically.

Critical Thinking Modules

The second site to be explored consists of the Critical Thinking page. This site contains WWW links and exercises requiring individual problem solving and group interaction via a Class List for computer conferencing. Students analyzed practice situations, trends and issues in nursing, and ethical issues in these assignments. This sharing of information and ideas enhanced the learning experience.

Problem Based Learning Modules

In the advanced medical nursing course, students worked collaboratively to analyze two complex cases. They also posted a case study of their own, and then proposed opportunities for client advocacy and clinical research based on the cases presented by their classmates. Additional course content was covered via web based multiple choice questions for which students posted electronically both an answer and a short rationale for the answer.

Concept Mapping

The individual students use their concept maps (CM) to depict their frame of reference. This helps their other team members to visualize their thoughts on the interrelatedness of the concepts. The team must then blend all of the individual CMs into one team CM. The process of developing a team CM promotes congruity and cohesion. This consensual CM helps to guide the team through the research process.

Summary

Cyberspace offers us limitless choices in the educational arena to enhance our student's experiences. As educators, we must apply our science and wisdom to the human-computer interface to create educationally charged activities that inspire, motivate, and enhance our student's intellectual abilities. It is from these students, who are willing to pioneer with us, that we will learn how to keep our balance and maintain our footing while we venture out to take the next step.

WWW Search Tools: Let the Spiders Do Your Crawling

Susan Sparks, RN PhD, FAAN, National Library of Medicine

Estimates of the size of the World Wide Web (WWW or Web) vary from one source to another. However it is accepted that there are hundreds of thousands of servers currently operating. One Internet site which collects Web statistics, WebCrawler, reports that there are at least 259,847 individual servers as of September 16, 1996. Estimates of the number of files, also referred to as pages and documents, on each Web server are also vary. No matter which server or file figures one accepts, the size of the WWW is enormous. WebCrawler claims that, within the past year, the size of the Web has increased sixfold (no date, observed November 12, 1996, WebCrawler).

Finding specific information can loom as a formidable task to newcomers to the Web. They often begin a search for information by "surfing," accessing a colleague's favorite site, then roaming around in cyberspace, hyperlinking from one site to the next. This approach is inefficient and time consuming, and usually no more productive than walking through library stacks looking for a book or thumbing through pages and pages of journals hoping to find an article on a given subject. Fortunately, automated search tools are now available. These tools, often referred to as "engines," are powerful, swift, and convenient to use. This article will describe the components of search tools, compare the features and performance of five of the most popular tools, explain metasearch engines, and conclude with some guidelines for choosing an engine and refining a search. The value of search tools is demonstrated by the fact that their sites are some of the most popular on the WWW. According to the WebCrawler Top 25 most linked-to sites, five of the most popular search tools are Yahoo!, WebCrawler, Lycos, infoseek and Alta Vista.

Components of Search Tools

Search tools are made up of three basic components: 1) software which automates the acquisition of entries into a database; 2) the resulting database of WWW and sometimes other Internet sites; and 3) the engine or front-end interface used to perform database search and retrieval functions.

Acquisition

Acquiring Entries with Creepy-crawlers. Software packages that automatically acquire entries for the database are called robots, crawlers, or worms. One search tool, Lycos, chose its name because of the spider and web metaphor of the WWW. Lycos is from Lycosidae, the Latin name for a family of large active ground spiders that catch their prey by pursuit, rather than in a web. Lycosidae are active at night and noted for their running speed. Leading search tools use robots or spiders to automatically update their databases daily. However, individual site owners or users may also notify the search tool of a specific site to include.

Databases

What is Indexed? Robots, spiders and worms vary in the information they collect from each site they visit. All of them index URLs and titles. Some also index major section headers, the first lines of text on a homepage, frequently mentioned words and concepts. Some index every word. Some search tools describe how their databases are indexed, most do not. Because of the variations in what is indexed, the size of each search tool's database varies. Some report their database size as numbers of servers, URLs, or files. Since servers may host a few or many URLs, it is not possible to compare URL numbers with server numbers. Furthermore, URLs may represent a high level in a Web site, or it may be just an individual file within a much larger site. Therefore, it is impossible to compare URL numbers with each other.

Each engine searches a specific, yet rather amorphous, constantly evolving database. Although some claim upwards of a million files, no single search engine's database covers all of the Internet, not even the subset of the WWW. Strong competition exists amongst search engine providers. Thus, in addition to indexing a portion of the Web, many search engines offer access to additional databases and include other special features. Most rely on advertising to generate income and currently do not charge the user. In order to attract larger user populations which in turn attract more advertisers, search tools are ever changing in an effort to meet or test supposed user need and interest.

Front -End Interface

Input and Output. The databases of four of the compared engines are both searchable and browsable. "Searchable" databases require the user to enter a term or phrase for which the engine performs a search in order to find information on a topic. "Browsable" databases allow looking around or surfing via pre-selected categories, or a series of menus and submenus. At this time, Alta Vista is the only search tool of the five that permits searching, but not browsing. Yahoo! is remarkably different than the other engines' databases. Yahoo! created a directory of its database, which is browsable by category. In addition, Yahoo! searches for terms as they appear in categories and reports output by category.

What are the Input Features?

The number and variety of input features influences the specificity and complexity of searching and the relevance of the hits retrieved. The more features available, the more opportunity to tailor the search, increasing the likelihood of relevant retrievals, called "hits". However, the more options available, the more novices must learn to construct their search strategy appropriately. All of the search engins allow logical ("and"/"not") operators. Some also allow the use of adjacency operators ("next", "near", "adjacent", "with"). The definition of "near" varies from one tool to another. Alta Vista Advanced interprets near as terms that are within 10 words of each other. On WebCrawler, "nearness" or adjacency can be specified by choosing from a list the maximum number of words allowed between the two terms. The case of characters is important to most search engines. Most also permit searches on symbols and numerical strings, such as EMT and 911.

Wildcards are used to complete stems or trunks of words in ways the searcher doesn't have to specify or anticipate. For example, the stem "nurs" and a wildcard would retrieve hits including "nurse", "nursery", "nursing", etc. As shown in Table 3, most of the engines allow wildcards. Although the input features may be the same, the syntax and symbols used vary from engine to engine (Table 3). For example, although two engines may accept wildcards, in one engine a wildcard may be expressed as a star (*); in another, it may be a dollar sign ($) or pound sign (#). Symbols to represent a phrase vary from putting quotation marks around words, to enclosing words in parentheses or brackets. Knowing how to express strategy and tactics demand examination of HELP files, which are also called FAQs or options.

About half the engines compared allow searchers to limit the number of hits per page. Lycos Customized automatically limits the maximum number of hits retrieved to 100. A Yahoo! option allows users to find matches more recent than a specified date. Alta Vista Advanced has an option allowing users to enter a start date and an end date. Many search engines display the results in some relevance, matched, or ranked order. However, only two, Alta Vista Advanced and Lycos Customized, allow searchers to specify relevance or degree of match on input.

What Are the Output Features?

The displays of many engines depend on the level of detail chosen for display (Table 4). Most of the engines display in more than one level of detail, three of them display in three levels. Most also include the size of the page to be retrieved. Whether the URL appears in the main text of the output influences the usefulness of printing the output. If the URL is not in the text, the underlying links cannot be shown. However, the default, summary, and detailed levels of output are most likely to include the URL in the main text. Only Yahoo! and Lycos Customized highlight the search term(s) in the text. Thus, if a word has been truncated or stemmed, the actual word used by the engine in retrieval is indicated by these two engines. Both Alta Vista and infoseek ultra use word stems or substrings. If this feature is considered undesirable, it is possible to eliminate it on input. In addition, these two engines provide a count of the number of hits of each word or term used in a search.

Most search engines sequence display outputs by relevance matching, ranking, percentage, or score. Each has a certain method for establishing relevance, although not all describe their method. Some base relevance on the frequency of occurrence of the search term, i.e., the more times the search term occurs in a hit, the more relevant it is. Others base relevance on frequency of the term searched in the entire site, the proximity of one term to another, and whether or not the search term is found in key sections such as titles or headings. Currently, the HELP files of Lycos, Alta Vista and infoseek describe how relevance is determined. Only Alta Vista Advanced and Lycos offer the user some control of how relevance is determined. Other variations to consider are exhibited by Yahoo! and Alta Vista: Yahoo!

displays hits according to its indexing categories, and then alphabetizes them within each category; Alta Vista displays the date of creation of the page to be retrieved.

How Do They Perform?

A variety of terms and syntaxes were chosen to compare the performance of the five most widely used search engines. Performance was considered a function of speed of the search, retrieval of hits, and degree of relevance or match. Insignificant differences in speed were found between the various engines when searching for the same terms. However, the variations in the number of hits and their relevance were remarkable.

Selected terms were given to each engine on the same day as shown in Tables 5 - 11. Yahoo! retrieved the least number of hits for each individual search entry (Table 5). Yahoo! does not consider relevance. Variants of the terms þmedical informatics,þ þnursing,þ and þinformaticsþ retrieved the same hits. Comparing total hits on all terms, both Alta Vista versions (Tables 6 and 7) retrieved large numbers of hits. Although there were significant differences between the numbers of hits on the first three terms, the number of hits retrieved in all trials of both versions of Alta Vista were too many to explore individually.

WebCrawler, Lycos Customized (Table 8), infoseek, and infoseek ultra report relevance as percentages. Lycos Customized reported a maximum of 100 hits per term and each of these was reported as 100% relevant. WebCrawler, infoseek, and infoseek ultra were more variable. To assess retrieval relevance and robustness, three scores of relevance were examined: percentage at maximum score, percentage at the 10th score, and percentage at the 25th score. Not one reported the maximum score to be 100% relevant, in spite of huge numbers of hits.

Of the more than 45 thousand hits reported by WebCrawler for medical informatics, the maximum relevance was only 96% (Table 9). WebCrawler retained the highest percentages of relevance on all terms at the 10th and 25th hits. "Nursing informatics" and "health informatics NOT medical retrieved a number of hits that could be examined individually relatively easily. For "nursing informatics", the relevance percentages at maximum, the 10th hit, and the 25th hit were within an acceptable range of 96% to 91%.

Infoseekþs relevance for all terms at maximum hits, at the 10th hit, and at the 25th hit, ranged from 78% to 51% (Table 10). This seems unusually low considering there are more than 53 thousand hits for þmedical informatics.þ "Nursing informatics" and "health informatics NOT medical retrieved a manageable number of hits but, at maximum, had relevance percentages of only 78% and 69% respectively. Use of quotation syntax retrieved a huge number of hits of "medical informatics" and "nursing informatics." However, for these two terms the percentages of relevance at maximum, 10th hit, and 25th hit were all 95% or greater.

What About the Metasearch Tools?

Metasearch tools combine the searching of several databases. Three such engines, Starting Point, BRS, and MetaCrawler were chosen for comparison on the basis of how they perform searches, their popularity, power, uniqueness and promise. Table 12 lists their URLs and the engines included in each. Some of the engines, like Savvy Search and The Internet Sleuth, are metasearch engines themselves. Savvy Search searches three tools: Yahoo!, Lycos, and Galaxy, and offers 19 different user language options. The Internet Sleuth accesses more than 21 search tools.

Starting Point is currently the most popular metasearch engine, ranking number 7 on the WebCrawler Top 25 most linked to sites (September 16, 1996). In comparison, neither MetaCrawler nor BRS appeared in the Top 25. Metasearch engines can perform searches on one of two different ways. They may conduct searches of engines specified, one at a time, in a sequence chosen by the user (Starting Point and BRS) or perform searches of databases simultaneously (i.e. in parallel) eliminating duplicate hits (MetaCrawler).

Certain engines, like Starting Point and MetaCrawler, offer the convenience, of using only one input form for searching a relatively large group of databases. However using only one input form for all engines precludes customizing and taking advantage of the individual variants of the databases to be searched. Consequently, the number of hits may vary and their relevance may be questionable. The newest of these metasearch tool, BRS Search, has the distinct advantage of using the specific input form associated with each individual engine and database to be searched. This allows users to customize searches to take advantage of the variants of each engine and database.

MetaCrawler possesses other useful features. Users can choose between a fast and comprehensive parallel search. Searches can be limited geographically and by organizational category (e.g., edu, com). In addition, the maximum wait on retrieval from any one search engine can be limited, as can the number of hits per engine and the number of hits displayed. Hits are ranked in relevance order and each names the engine from which it was retrieved by. Starting Point -- as huge as it is -- is also browsable by category. BRS offers opportunities to search the Information SuperLibrary, to search for jobs, downloadable files, and even people and companies on the Internet. Metasearching is a very powerful and useful approach to finding specific information!

Choosing a Search Engine

Choosing a particular search engine depends on the question(s) posed and the demands for the answer(s) being sought. Some of the characteristics to consider are: Is general or specific information being sought (to browse or to search)? Are the input options suitable to the questions and answers desired? How new is the information? Is there a specific time frame involved? How large is the database? How deep is the indexing? What is the quality of the indexing?

Whichever search engine you choose: Know the nature of its database. Always read the FAQ and or Help. Use appropriate operators and syntax. Spell accurately. Search on the unusual word(s). Try synonyms. Avoid natural language queries. Note terms used and repeat the search Search more than one engine/database.

Traditional bibliographic databases no longer ensure access to the most current information; the Internet does. In fact, today, some material only appears in electronic form. Luckily, many search engines are now available that automate the process. They are convenient, swift, easy-to-use, and frequently updated. So why not let the spider(s) do your crawling?

Evaluating Web sites: quis custodiet ipsos custodes?

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At present, it is said, anyone can put anything up on the Web - and they probably will. This can present problems for those who wish to access "accurate" and "reliable" information. The issues of why and how to evaluate Web-based materials therefore have growing importance, and we aim to explore some of the issues pertinent to evaluating healthcare-related Web sites. These issues have been discussed, in part, by Bridges & Thede (1996) and Murray (1996) in the paper-based nursing literature, and are frequent topics for discussion on many of the Internet discussion lists. We will consider three main areas:

- why should we be concerned with Web site evaluation?
- what evaluation criteria exist; and can we use the same ones as for offline resources?
- how do we evaluate the different types of Web sites that exist?

In addition, we will briefly look at some other issues, including the appropriate use of media on websites, including writing for Web pages.

Why We Need To Be Concerned With Web Evaluation

The major reason to be concerned with evaluating Web sites, or teaching others how to evaluate these sites, is to protect those most vulnerable to being harmed in some way if they act on information they receive from a site. In the case of healthcare, our most vulnerable populations are patients and their families, and students in health science professions.

Healthcare professionals have an obligation to find out if clients and families are seeking and using information from the Web. Recent movies and television programs have shown heroes finding obscure, life-saving information on the Internet. And, somehow, just the fact that information is travelling quickly through space and magically presented on the wise computer screen lends it an air of authority beyond its due. Sites with official sounding names can also dupe the inexperienced into unquestioned acceptance of the content.

Students are often overwhelmed with the enormity of the information on the Web. Educators need to help students quickly evaluate sites so that they can concentrate their efforts and time on those that can contribute to their learning. While we cannot be our brother's keeper, as health professionals we have an obligation to educate clients and students on how to evaluate and use the information from this powerful resource.

Evaluation Criteria

Look around the Web and you will find many sites proudly sporting awards they have received such as "site of the month" or "5-star site." No doubt many of them deserve such accolades - but who has awarded them? Why have they been awarded? What criteria have been used? A recent article in *Internet World* (Venditto, 1997) notes that most of the rating services for Web sites are self-appointed. Many of them give little consideration to content, and their criteria and motivation are open to question. Another problem with relying on awards is that many sites change almost daily. How long should an award stand as a testimony to its merit? Most awards do not even state the year in which they were bestowed. And does any rating service revisit and re-evaluate their award sites? So, how do we define, or judge, what is "best?"

Many of the sets of criteria have been developed by librarians and information scientists, although some nursing colleagues (Yensen, 1997) have started to index some of these sites, to provide resources for their students and other users. In addition to the more general evaluation criteria, a number of organizations provide peer-reviewed collections of materials and kitemarking for sites. Among these are OMNI (Organising Medical Networked Information) in the UK and the Health on the Net Foundation, based in Switzerland. The U.S. Department of Health and Human Services (1997) just launched a gateway site for health information resources from the federal government, state and local agencies, not for profit organizations, and universities.

A wide range of evaluation criteria have emerged from the various schema proposed, but among the most common ones are:

- the authority of the author/creator (which includes author/s being identified)
- currency/updatedness & stability of information
- accuracy of information & comparability with related sources
- workability: user friendliness, connectivity, search access
- purpose of the resource
- nature of intended users.

Additional criteria have also been mentioned, such as whether criteria for information inclusion are stated; citation of material sources; scope & comprehensiveness of the materials; uniqueness of resource; and level of regard by Web community. Some checklists have been developed to help users rate sites (McLachlan, 1996; Scholz, 1996).

However, for many health-related sites, the main issues appear to revolve around content, rather than design. The criteria put forward by OMNI and the Health On the Net (HON) Foundation all revolve around content issues. OMNI, for example, aims to "evaluate, describe and provide access to biomedical network resources for the UK higher education and research community," through inclusion of materials "only if they contain substantive information" which has undergone a peer review process according to particular guidelines. The HONcode seeks to "help unify the quality of medical and health information available on the WWW," through the provision of "information, services or resources .... that meet specific quality standards." They require that "advice provided and hosted on the site will only be given by medically trained and qualified professionals," unless clearly stated otherwise.

In many ways, these are the same kinds of criteria which are used for paper-based resources, so is there really such an issue? In fact, Tillman (1997), a librarian, suggests that we "need to use the same critical evaluative skills in looking at information on the Internet that we would do in" other media, and asks whether the continuum of information of the Internet is any different from print.

Technology Issues

There are, however, some technology issues that users need to be aware of in order to evaluate a site and its content. Some versions of browsers (and "bugs" in browsers) can alter how information is displayed on the screen. There are instances where large blocks of text do not display . The omitted text can alter content, possibly leading to incorrect conclusions. It is essential that websites indicate which browsers (including version number) display their content correctly. Users must be educated to note this information and compare it to their client browser.

Another issue created by Web technology is linking from one site to another and accessing a site from a search engine. Links can deposit the user in a new site without their awareness, sometimes deep into content, where they may be reading information without benefit of previous text that may set parameters or context. While these are not issues for evaluating a site, new users must be taught to recognize that they have linked into the body of a new site and therefore must do another evaluation.

Identifying Purpose of Web Site

Individuals, organizations and companies put up websites for a variety of reasons. On the web, the lines between information and advertising can easily become blurred. Additionally, some sites are supported in whole or in part by sponsors. Does that affect the scope of information offered on the site? Alexander & Tate (1996 a,b,c,d) offer guidelines that help users recognize the purpose of five different types of pages: advocacy, business/marketing, informational, news, personal home pages. They provide links to pages that exemplify a site with a specific purpose, and list specific criteria that are appropriate for evaluate each type of site.

Beyond Content - Evaluating Design and Use of Media on the Web

Web standards and style manuals, such as those published by the U.S. Dept. of Education (1996) and Yale University (Lynch & Horton, 1997) provide extensive "tried and true" guidelines to website structure, page design, navigation and optimal performance. These standards can be used to develop tools that evaluate these elements of typical informational sites. However, as bandwidth improves and web designers attempt innovative strategies, content is being delivered in more complex formats (see, for example, Interactive Patient, Lehmann & Hayes, 1995).

A well-known instructional designer (Jonassen, 1984) wrote an article more than 15 years ago that discussed 144 ways to vary an instructional event. Any given material contains many instructional events and the multimedia delivery platforms of today offer more options than were available in the 80's. So WHICH of the 144+ should be chosen to deliver a given segment of the content?

- text
- hypertext
- (hyper)text with graphics
- an animation
- audio
- video
- a 3D model?

While we know the strengths and weaknesses of an individual medium, when media are combined, the result is not just a combination of discrete elements, but something new and different, which should do a BETTER job of conveying the content than any of the elements could do alone. Multimedia has been used in computer products, mainly CD-ROM. But the same design, transferred to a different delivery system like the Web, changes it yet again. The new delivery system has intrinsic characteristics that may enhance or minimize the effectiveness of any media component. Take a look at the Nursing Rounds Continuing Education feature on http://www.ajn.org to see a multimedia case study that collects user information in a database to provide a new self assessment tool.

Writing for the Web

The hypermedia capabilities of the Web allow for the exploration of new ways of producing and structuring content. Many sites currently adhere to a linear progression of text, simply mimicking the paper model. However, even the organization of text can take on new meaning on the Web. A look at http://www.december.com/cmc/mag/1997/jan/murray.html, for example, shows how Peter Murray has attempted to develop a new style designed to maximize the characteristics of hypertext linking of information. Other papers available from the CMC Magazine site also develop similar styles. They do require new ways of writing outside the traditional paper-based academic mode, and this may be hard, or even threatening. But we believe the possibilities should be explored.

If one purpose of a site is to be innovative, we need to be open to new ways of doing things and to support this type of exploration, not dismiss it just because it is different. It may take some "getting used to" to appreciate it's value, just because it IS different from the ways we are accustomed to viewing content/information.

According to Naisbitt (Megatrends, 1984), new technologies progress through three stages: Stage 1 Content is moved from an old medium to the new technology and resembles the media it is replacing. Stage 2. People start to exploit the unique features of the new technology and it moves into a stage where marked improvement and innovation occurs. Stage 3 New directions and uses are discovered that grow out of the technology itself. On the Web, we are just beginning to move from Stage 1 to Stage 2. Be gentle in your evaluation of innovative sites!

Summary

Our title, "quis custodiet ipsos custodes," has been translated several ways, including "who will watch the watchers," or "who will guard the gatekeepers." Tillman (1997), while not telling us "who," provides perhaps the best answer we can give at present, by saying that she takes a "pragmatic view of quality. At the very least, I want my facts accurate, current, and the bias and authority of authors clear."

We need to remember that: 1) the quality of Web-based resources varies greatly; 2) the five traditional print criteria of accuracy, authority, objectivity, currency, coverage may be appropriate, but 3) if we believe that the Web is/should be more than a print delivery system, then new techniques are also needed to evaluate Web resources; 4) we need to identify the type of Web resource being considered, i.e. information dissemination; education and training; commerce/advertising; entertainment; communications, innovation, but 5) most sites serve more than one purpose.

With these in mind, we can each be our own gatekeeper.

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Overcoming Budget Constraints to Implement CBT in Small/Rural Hospitals

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Employees of Worthington Regional Hospital, a rural Minnesota 93 total bed facility, were so anxious to begin their annual review training, they began asking about it two months before the scheduled program. Looking forward to the mandatory reviews of blood borne pathogens, hazardous substances, TB, and fire, electrical, and back safety is an amazing new attitude that we've seen since the introduction of a computer-based system of training.

Cost and time savings also are significant benefits of the system. In addition to the 93 percent employee satisfaction rate, we achieved a 58 percent time savings. Our cost savings was 34 percent in year one (with capital equipment purchase) and 84 percent in year two. Compliance with JCAHO and OSHA standards was 96-98 percent.

What is the System?

The de'MEDICI System (Williams and Wilkins, Baltimore, Maryland) is a mobile education workstation designed to be moved to work areas where employees complete training on the job. It has a dedicated computer, keyboard, and trackball that are secured by cable to the workstation. The pre-loaded software employs interactive computer assisted instruction technology that teaches, tests, and documents compliance of JCAHO and OSHA mandated topics. A small printer and nylon carrying case can be brought to the workstation to print out database supported reports of completion.

The system is simple to operate and completely self-explanatory. It does not require any previous computer experience. The interactive software holds interest while the animation, graphics, and sound effects are fun. Employees work individually, proceed at their own pace, and must complete all items to receive credit. Positive reinforcement and/or remedial instruction is given for each concept throughout the module. Employees sign-on the computer by selecting one of 16 job occupation groups. Program content is then tailored by occupation with different questions, scenarios, and reading levels. A lab tech and janitor can both complete the Preventing Bloodborne Pathogens module, but each will receive job-specific content.

Convenience and control of the training schedule are things our employees like best about computer-based training. They also say it's easy, interesting and fun! In fact, 95 percent of our employees completed training during regularly scheduled work hours. The system gave them freedom of choice and some control over their training experience. This has improved their readiness to learn and resulted in improved quality of the learning experience.

Overcoming Budget Constraints.

In order to make the initial cost of the system affordable, we formed a network of eight neighboring healthcare sites (980 employees), including six sites managed by the Sioux Valley Health Network (SVHN). SVHN approved the first network as a six-month pilot project, which turned out so well that it has been expanded to four networks in a three state area: southeast South Dakota, southwest Minnesota, and northwest Iowa. A total of five computer workstations rotate to the 25 sites (including hospitals, nursing homes, and clinics) and provide annual review training to 3,577 employees. The rule of thumb that we followed in setting up the networks is that one computer workstation can provide training on six topics for 800-1000 employees in a calendar year.

Site coordinators at each facility oversee the system. The site coordinator's role includes introducing the system to the facility and coordinating its use, managing the rotation schedule, setting up the system for the rotation, and maintaining the facility's database records. Most of the site coordinators in our region are registered nurses, although there also are staff members from human resources, data processing, and environmental services.

In addition to the site coordinators, a network coordinator acts as facilitator for the entire network. The network coordinator sets up a system for sharing the system, establishes a rotation schedule among network facilities, conducts training programs for the site coordinators, and acts as liaison with the

vendor for customizations, upgrades, and hardware maintenance. The network coordinator also sponsors a year-end meeting so that all site coordinators can share experiences and information.

Sharing the Cost.

Each facility shares expenses and rotation time equally based on the number of employees they have in the network. For example, in Network I, a facility with 90 employees would have a 10 percent share, giving them thirty-six days per year with the system. There is a make-up rotation at the end of the year, and each facility reserves a few days from their total time for that rotation.

Customization of the software was an important consideration in making the system work for such a diverse range of facilities. Each system's sign-on screen lists the names of all of the facilities in the network. To get started, employees simply select their facility. Since database records can be sorted by facility, it's easy for site coordinators to focus on their own selections of the database.

The capital equipment expense of a computer-based training system can seem beyond the means of most small/rural sites. However, by joining together to purchase and share this technology, we are all able to save time, money, and enjoy the benefits of CBT. And so, if the thirty four employees of an eight bed hospital in Westbrook, MN can use a CBT system for their mandatory training, why not your facility?

Using CBT to Orient and Educate Employees to Meet Joint Commission Standard

Sandra Rogers, Med, MBA, Computerized Educational Systems
Nancy Edwards, RN, MS, DeSoto Memorial Hospital

Joint Commission on Accreditation of Health Care Organizations sets standards for its accredited institutions to follow. Accreditation depends upon adherence to these standards, which are largely based upon performance measures. Many insurance companies, including Medicare, may not reimburse health care organizations if the organization does not meet these standards. Formerly, much of the accreditation survey involved intense scrutiny of the organization's policy and procedures books to make sure they were in line with the current standards. Today, the accreditation process examines how the standards are being followed in actual practice. For example, instead of reviewing the policy for providing patient education, the surveyor may actually interview patients to see what they have been taught.

In the past, the Joint Commission mandated that certain training be held on an annual basis. These training requirements pertained to the Environment of Care Standards, such as fire safety, and to Infection Control. During the survey the institution would provide statistics to show the percentage of employees who had attended the required programs. Now the focus has shifted to the actual performance of the individual employee. The surveyor may look at employee education records to see what training has been done, but he or she also will randomly ask employees questions that pertain to the facility's application of the standards. This shift in perspective from "what class has the employee attended" to "what does the employee actually know" has great impact on the type of training that is needed.

Unlike Joint Commission, OSHA continues to mandate annual training. Current regulations require training on bloodborne pathogens and hazardous communication. Failure to meet these training requirements can result in large fines for the facility.

Many facilities use video tapes, live classes, or newsletters to deliver training to meet Joint Commission standards and OSHA requirements. These methods can be expensive, time-consuming, difficult to schedule and/or ineffective. The shift towards demonstrating competency has made the use of computers a better choice. Computer-Based Training(CBT) provides learners with the opportunity to demonstrate what has been learned in a simulated on-the-job scenario. In addition, it is available 7 days per week and 24 hours per day, without requiring the presence of an instructor. Unlike video tapes, many CBT programs allow the facility to customize the content with facility-specific information. Some CBT programs allow further customization by job position, so that employees only complete those scenarios that pertain to their job. While no program can guarantee that an individual employee will answer a surveyor's question correctly, the competency-based computer program can greatly increase the chance for success.

Another feature of CBT is the ability to track training and generate reports. The program can notify employees and the facility which courses need to be taken and when they must be taken. Reports that indicate who has taken and who has NOT taken a course are usually available in CBT programs. Flexibility to specify which department(s), position(s), employee(s) and date ranges are possible in CBT with a mere click of the mouse. Reports can be a valuable aid to:

- Identify employees who need to demonstrate competency prior to a survey visit.
- Create the annual report on competency to the governing board, as mandated by JCAHO
- Determine if an employee has completed training prior to his/her annual review/raise
- Pinpoint training problem areas, so that remediation can be initiated.
- Document training for OSHA

Steps to Implement CBT in Hospitals

Karen M. Hopkins, BS, CT(ASCP), MA, m3 The Healthcare Learning Company
Kathy Hoelscher-Levine, LPN, CIC, Wellington Regional Medical Center

While the use of technology to deliver education and training to hospital employees is seen as a boon to many healthcare educators, most organizations experience difficulty in fully utilizing such a system. In working with many hospitals over a three year period, several factors affecting the outcome of a technology delivered education system have been revealed. The introduction of technology delivered education presents a significant paradigm shift in the way education is presented to employees. Firstly, the employee becomes the driver of her/his own education schedule, rather than a posted schedule of learning events to which the employee's schedule must be adapted. This is just-in-time, anytime learning. Secondly, the distribution of education and information is no longer burdened with the problematic issue of available classroom space and instructors.

While technology delivered learning offers the solution to many education issue and concerns, it also presents some challenges - as does any new initiative. This presentation will present and discuss these factors, which include:

1. the need for a comprehensive implementation plan.
2. the importance of a communication process;
3. the importance of management/supervisory support;
4. the need for HR policies to reinforce a shift in responsibility;
5. the requirement of adequate access to equipment.

A comprehensive implementation plan is the road map, if you will, of a successful implementation. This should come as no surprise to anyone who has implemented a new program of any description in an organization. There is no substitute for good planning. In general, people do not care for surprises in the workplace unless it is a birthday or Christmas. Therefore, the need for a comprehensive communication plan cannot be under emphasized. Employees need to see this as an advantage for them, not another burden added to their everyday list of things to do.

Accessibility is the key to a successful learning initiative, regardless of the delivery mechanism. Managers and others in leadership positions provide a key to that accessibility through their language and behavior around such programs. Employees "get the message" early on as to whether this is considered a valuable use of their time or not by the verbal and non-verbal responses of their leaders. The old "WIIFM" (What's in it or me) factor is just as important here as it is in nearly every other facet of an organization. Employees need to see that there is support from the top, and that learning and education are an important. To that end, when employees see that completion of education requirements plays a role in annual reviews or in performance reporting, the message is clear - and powerful.

As mentioned earlier, access is critical. The access referred to here is physical access. If learners must schedule time on the computer, travel any significant distance from the work area, or have to go through locked doors to access the computer, access is compromised. The negative impact of this situation cannot be over emphasized. The organizations that have addressed the above issues have found significant success in the use of technology delivered learning systems. This presents a new paradigm in education for many healthcare organizations, therefore a significant amount of support at the beginning of the process is necessary to make a smooth transition to this mode of education for the whole organization.

This presentation is based on the experiences of the two presenters who have successfully implemented technology delivered learning systems in hospitals and healthcare organizations of varying sizes over the past three years.

Becoming A Virtual School of Nursing--Strategies for Computer Mediated Course Design

*Diane Billings, EdD, RN, FAAN, Associate Dean, Teaching Learning and Information Resources and Professor of Nursing; Janie Canty-Mitchell, PhD, RN, Assistant Professor of Nursing and recipient of *Campus NETwork for Excellence in Teaching Summer Stipend*; Thomas Ho, PhD, Chair and Professor of Department of Computer Technology; Ali Jafari, PhD, Associate Professor, Department of Computer Technology and Director of Information Technology Lab and WebLab; James P. Turley, PhD, RN, Associate Professor of Nursing, Indiana University-Purdue University at Indianapolis*

I. Introductions

II. Becoming A Virtual School of Nursing

III. The Web Solution

IV. Course Selection--Issues and Resource Planning
- A. Strategies for selecting courses and programs
- B. Curricular Issues
- C. The Resource Team
- D. Infrastructure Support
- E. Faculty and student development

V. Conceptual and System Design of Course
- A. Strategies and Technology Solutions
- B. Selecting Media
- C. Selecting Course Support Tools

VI. Technology Infrastructure
- A. Networks
- B. Digital Libraries
- C. Client Workstations

VII. Usability Testing
- A. Technical tryout
- B. Peer Review--content accuracy; pedagogical check points
- C. Instructional tryout--testing with students

VIII. Course Implementation: Teaching Computer Mediated Courses - The View of the Faculty
- A. Faculty Development
- B. Funding
- C. Modifying Existing Courses for the Web-based learning environments
- D. Teaching Strategies
- E. Facilitating transitions for students and faculty
- F. Evaluation/assessment of learning outcomes and learner satisfaction

IX. Panel Discussion

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With experience in establishing more than 200 health promotion and patient education consumer resource centers across North America, and a database of more than 15,000 reviewed health items, Longe brings an unequaled knowledge of the subject and a host of creative ways to make a resource center successful.

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Patricia Myler is Director of the Sickle Cell Multimedia Resource Center at Grady Hospital in Atlanta Georgia. She has worked as a systems analyst, corporate trainer, and college instructor. Trish received a Master's in Business Information Systems from Georgia State University. Her written materials include: an introductory-level computer concepts review text for college students; training manuals; user guides for PC software; and brochures and documents relating to health issues. Trish spends her spare time kayaking and searching for another sailboat to restore.

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Patricia Pasqual became the director of the Foundation Center in Washington DC in July 1994. Previously she managed the Center's Cleveland office for more than eight years. The Foundation Center is the national information resource on foundations and corporate grantmakers established by foundations in 1956. In Washington Ms. Pasqual manages a staff of seven, who provide free reference service to more than 14, 000 visitors a year. Ms. Pasqual is on the board of the local chapter of the National Society of Fund Raising Executives. She also volunteers at the Folger Shakespeare Library and for the Reading Connection.

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