WEB-BASED TRAINING

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Summary

Advances in information technology, coupled with the changes in society, have created a new paradigm for training. These massive changes have implications for learning and human development throughout the world. Participants, from the perspective of this new training paradigm, require rich learning environments supported by well-designed resources. Learners now expect on-demand, anytime/anywhere high-quality instruction with good support services. To stay viable in this global competitive market, providers of education, training and learning resources must develop efficient and effective learning systems to meet the society's needs. Therefore, there is a tremendous demand *for affordable, efficient, easily accessible, open, flexible, well-designed, learner-centered, distributed and facilitated learning environments.* To meet the needs of flexible and distributed learning environment, corporations, government agencies and universities worldwide are creating online training and learning programs. At all levels of these institutions, employees and learners are being encouraged to participate in online learning activities.

1. Introduction

The recent emergence of the Web as a new learning medium (delivery system) is definitely a blessing for education and training fields. Growing importance of the Web and the Internet for information-sharing, decision-making, instruction and training are recognized worldwide. The Web provides an open, dynamic and flexible learning

environment with implications for countless applications with respect to education and training. Advances in information technology and new developments in learning science provides opportunities to create well-designed, learner-centered, engaging, interactive, affordable, efficient, easily accessible, flexible, meaningful distributed and facilitated learning environments. Various attributes and resources of the Web make it possible for institutions to offer instruction, training and learning resources without the time and place constraints of traditional face-to-face instructional and training programs. Numerous names are used to describe Web-Based Learning (WBL) activities, including Web-Based Training (WBT), Web-Based Instruction (WBI), E-Learning (EL), Distance Learning (DL), Distance Education (DE), Distributed Learning (DL), Advanced Distributed Learning (ADL), Internet-Based Training (IBT), Online Learning (OL), Online Training (OT), Mobile Learning (m-Learning) to name a few. The term WBT is used most often in business and industry to describe Web-based learning while the term WBI is more common within academic settings. In this article, however, WBT is used to discuss the usage of the Web to foster learning and human development throughout the world.

Designing and delivering WBT requires thoughtful analysis and investigation of how to use the Web's potential in concert with instructional design principles and issues critical to various dimensions of Web-based learning environments including, pedagogical, technological, interface design, evaluation, management, resource support, ethical, and institutional (Khan, 2001).

In designing training on the Web, we should explore various issues encompassing the eight dimensions of the Web-based learning environment that can help us think about various learning features appropriate for our target audience. The capabilities of various attributes and resources of the Web must be examined to see how they can be best utilized to create various WBT learning features. In this article, I would like to discuss the following:

- Web-based learning environment
- WBT components and features
- WBT features and components associated with web-based learning environments

2. Web-Based Learning Environment

Numerous factors help to create a meaningful online learning environment, and many of these factors are systemically interrelated and interdependent. A systemic understanding of these factors can help designers create meaningful distributed learning environments. After reflecting on the factors that must be weighed in creating effective distributed learning environments, I developed a Framework for Web-based Learning (Khan, 2001). The seeds for The WBL Framework (Figure 1) began germinating with the question “What does it take to provide the best and most meaningful flexible learning environments for learners worldwide?” The WBL framework has eight dimensions: pedagogical, technological, interface design, evaluation, management, resource support, ethical, and institutional. Each dimension has several sub dimensions, each consisting of items focused on a specific aspect of a Web-based learning (WBL) environment. Please note that a new book entitled "E-Learning Strategies" ***(BooksToRead.com/OL)*** discuses

numerous factors relevant to WBL. Also, a forthcoming book entitled "Web-Based Learning" ***(BooksToRead.com/WBL)*** includes case studies, design models, strategies, critical issues related to one or more dimensions of the WBL framework.

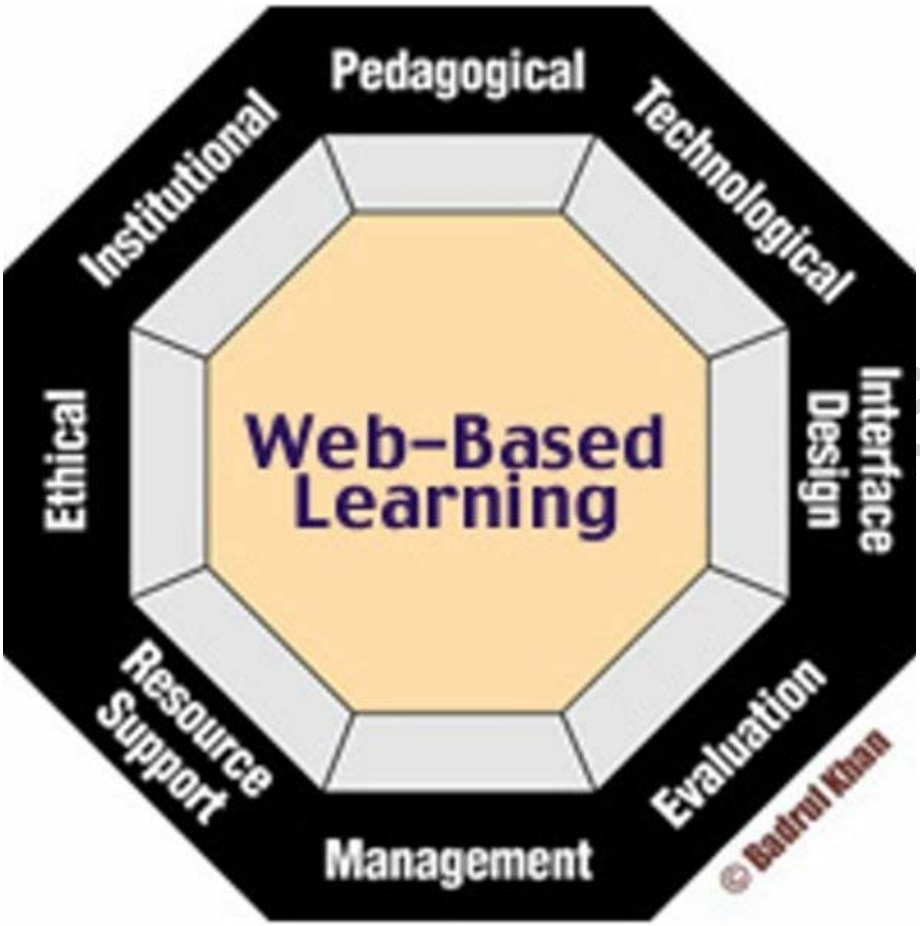

Figure 1: The WBL Framework (omit)

The *pedagogical* dimension of Web-based learning refers to teaching and learning. This dimension addresses issues concerning goals/objectives, design approach, organization, methods and strategies, and medium of Web-based learning environments. The *technological* dimension examines issues related to technology infrastructure related to Web-based learning environments. The WBL Infrastructure includes technology planning, guidelines, computer hardware and related technologies, software, operating system, Internet connection, and Internet services for instructors and learners. The *interface design* dimension refers to the overall look and feel of Web-based instructional and training programs. Interface design dimension encompasses page and site design, content design, navigation, and usability testing. The *evaluation* for WBL includes both assessment of learners and evaluation of the instruction and learning environment. The *management* of WBL refers to the maintenance of learning environment and distribution of information. The *resource support* dimension of the WBL framework examines the online support and resources required to foster meaningful learning environments. The *ethical* considerations of Web-based learning relate to social and cultural diversity, geographical diversity, learner diversity, information accessibility,

etiquette, and the legal issues. The *institutional* dimension is concerned with issues of academic affairs and student services related to Web-based learning.

3. Web-Based Training Components and Features

In this chapter, a WBT program is discussed in terms of various components and features that can be conducive to learning environments. *Components* are integral parts of a WBT system. *Features* are characteristics of a WBT program contributed by those components. Components, individually and jointly, can contribute to one or more features (Khan, 1997). For example, *e-mail* (component) in a WBT program can provide *asynchronous communication* (feature) to students and the instructor. Likewise *e-mail, listservs, newsgroups, conferencing tools, etc.* (components) can jointly contribute to the creation of a virtual community (feature) on the Web.

WBT Component $\Longrightarrow$ WBT Features

3.1 WBT Components

WBT components are clustered into eight general categories. Please note that within the scope of this chapter, it was not possible to discuss the functions of all the various components that might constitute a WBT program. However, several chapters in my *Web-Based Instruction (1997)* and *Web-based Training (2001)* books address many of these components (please use book index to locate them). Please note that within the scope of this article, various WBT components are listed in the following eight categories. However, as the technology continues to improve, new WBT components may be available to be added to the list.

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1. Content Development

(a) Learning and instructional theories
(b) Instructional design (ID)
(c) Curriculum development

2. Multimedia Component

(a) Text and graphics
(b) Audio Streaming (e.g., Real Audio)
(c) Video Streaming (e.g., QuickTime)
(d) Graphical User Interface (GUI)—uses icons, graphics, windows and a pointing device instead of a purely character-mode interface (Tittel and Gaither, 1995 as cited in Khan, 1997). Microsoft Windows and MacOS are examples of GUIs.
(e) Compression technology (e.g., Shockwave)

3. Internet Tools

(a) Communications Tools
(i) Asynchronous: E-mail, Listservs, Newsgroups, etc.

(ii) Synchronous: Text-based (e.g., Chat, IRC, MUDs, etc.) and audio-video (e.g., Internet Phone, CuSeeMe, etc.) conferencing tools.
(b) Remote Access Tools (Loggin in to and transferring files from remote computers.)
(i) Telnet, File Transfer Protocol (ftp), etc.
(c) Internet Navigation Tools (Access to databases and Web documents.)
(i) Gopher, Lynx, etc.
(d) Search and Other Tools
(i) Search Engines
(ii)Counter Tool

4. Computers and Storage Devices

(a) Computer platforms running Unix, DOS, Windows and Macintosh operating systems.
(b) Servers, hard drives, CD ROMs, etc.

5. Connections and Service Providers

(a) Modems
(b) Dial-in (e.g., standard telephone line, ISDN, etc.) and dedicated (e.g., 56kbps, DSL, digital cable modem, T1, E1 lines, etc.) services (http://whatis.com/dsl.htm)
(c) Mobile technology (e.g., connected wireless, wireless LAN, wireless WAN, wireless PAN or personal area network) (Polivka, 2001).
(d) Gateway Service Provider, Internet Service Providers, etc.

6. Authoring and Management Programs

(a) Programming languages (e.g., HTML - Hypertext Markup Language, VRML - Virtual Reality Modeling Language, XML – Extensible markup Language, XSL - Extensible Style Sheet language, XHTML – Extensible Hypertext Markup Language, WML-Wireless Markup language, Java, Java scripting, etc.)
(b) HTML Converters and Editors, etc.
(c) Learning Management Systems
(d) Authoring Tools and Systems (easier to use than programming languages)

7. Servers and Networks

(a) HTTP servers, HTTPD software, Web site, URL - Uniform Resource Locator, etc.
(b) Wireless Application Protocol (WAP)
(c) Common Gateway Interface (CGI)—a way of interacting with the http or Web servers. CGI enables such things as image maps and fill-out forms to be run.

8. Browsers and Other Applications

(a)Text-based browser, Graphical browser, VRML browser, etc.
(b)Links (e.g., Hypertext links, Hypermedia links, 3-D links, imagemaps, etc.)
(c)Applications that can be added to Web browsers such as plug-ins.

3.2 WBT Features

WBT features can be divided into two categories: (1) *key features* and (2) *additional features*. *Key features* are inherent to the Web and are integral to WBT design. They are available for the designers to incorporate within WBT lessons. In contrast, additional features are dependent on the quality and sophistication of WBT design. The effectiveness of additional features largely depends on how well the key features are incorporated into the design of WBT. *Key Features:* Interactive, multimedial, open system, online search, device-distance-time independent, globally accessible, electronic publishing, uniformity world-wide, online resources, distributed, cross-cultural interaction, multiple expertise, industry supported, learner-controlled, etc. *Additional Features:* Convenient, self contained, ease of use, online support, authentic, course security, environmentally friendly, non-discriminatory, cost effective, ease of coursework development and maintenance, collaborative learning, formal and informal environments, online evaluation, virtual cultures, etc.

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Bibliography

December J., & Randall N. (1995). *The World Wide Web 1996 unleashed* (3rd ed). Indianapolis, IN.

Donders, O., Eek M. & Remmers, E. (1995). WWW and it's potential for self-guided learning (http://www.to.utwente.nl/ism/online95/campus/library/online95/online95.htm).

Duchastel (1996). Design for web-based learning. *Proceedings of the WebNet-96 World Conference of the Web Society*. San Francisco.

Hiltz, S. R. (1994). *The virtual classroom: Learning without limits via computer networks*. Norwood, NJ: Ablex Publishing.

Kearsley, G. & Shneiderman, B. (1999). Engagement theory: A framework for technology-based teaching and learning. (http://home.sprynet.com/~gkearsley/engage.htm).

Khan, B. H. (Ed.) (2001). A framework for Web-based learning. In B. H. Khan (Ed.), *Web-based training*. Englewood Cliffs, NJ: Educational Technology Publications.

Khan, B. H. (2000c, July-August). How do you train for B2B Success? "Ask the Experts" Column. *The New Corporate University Review*. *8*(4), P. 19.

Khan, B. H. (Ed.). (1997). *Web-based instruction*. Englewood Cliffs, NJ: Educational Technology Publications.
Kearsley, G. (1996). The World Wide Web: Global access to education. *Educational*

McGreal, R. (1996). Roy's list of a dozen things that can go wrong in a World Wide Web course or even worse." *The Distance Educator, 2*(2), 6.

Polivka, B. (2001). Moble learning. *E-learning*. 2 (5), 30-33.

Sherry, L. (1996). Raising the prestige of online articles. *Intercom*, 43 (7), 24-25, 43.

Stancil, D. D. (1995). The Virtual lab: Engineering the future (http://www.ece.cmu.edu/afs/ece/class/projects/badelt/www/virtual-lab.html).

Wilson, B. G. (1995). Metaphors of instruction: Why we talk about learning environments. *Educational Technology, 35*(5), 25-30.

Additional Resources

http://BooksToRead.com/de.htm - recommended readings site in Web-based training and distance education
http://BadrulKhan.com - A hub for excellence in e-Learning.

http://WebCourseReview.com - A Web course review site.

Biographical Sketch

Badrul H. Khan is Director of the Educational Technology Leadership graduate cohort program at the George Washington University and founder of ***BooksToRead.com***. He is an international speaker, author, educator and consultant in the field of e-learning and educational technology and has the credit of first coining the phrase 'Web-based instruction' and popularising the concept. Through his teaching and publishing, he has been instrumental in creating a coherent framework for e-learning. He authored the following books: *Web-Based Instruction* (1997), *Web-Based Training* (2001), *E-Learning Strategies* (2004), *E-Learning QUICK Checklist* (2004), *Managing E-Learning* (in press), *Implementing E-Learning* (in press), *E-Learning: Design, Delivery and Evaluation* (in press), *E-Learning and Blended Learning Strategies* (in press), *E-Learning Quick Checklist* (in press) and *Flexible Learning* (in press). A sought-after keynote speaker on e-learning, he is past President of the International Division of the Association for Educational and Communication Technology (AECT). He served as a consultant/advisor to e-learning related projects at the World Bank, Ministries of Education in several countries, and academic institutions and corporations in the USA and abroad.