

# Web-Based Distance Learning and the Second Digital Divide

**Sheryl Burgstahler**

*University of Washington, USA*

## INTRODUCTION

In no field have we witnessed a greater impact of emerging technologies than in that of distance learning. Correspondence courses using printed material and postal mail have been replaced by Web-based courses with the potential to make learning available to anyone, anywhere at any-time. This potential cannot be realized, however, unless two digital divides are eliminated. Some people are on the wrong side of the first “digital divide” between the technology “haves” and the technology “have-nots”. The benefits of technology are less available to those who are poor, who live in rural areas, who are members of minority racial or ethnic groups, and/or who have disabilities (Kaye, 2000; U.S. Department of Commerce, 1999). Lack of access to new technologies limits their options for taking and teaching technology-based courses. This is true for individuals with disabilities, even though the rapid development of assistive technology makes it possible for an individual with almost any type of disability to operate a computer (2003 Closing the Gap Resource Directory, 2003). Unfortunately, many people with disabilities still do not have access to these empowering tools, putting them on the “have not” side of the first digital divide.

Within the group of “haves” with respect to the first digital divide, however, many people with disabilities face a “second digital divide.” This line separates people who can make full use of the technological tools, services, and information to which they have access, from those who cannot. Too often people with disabilities lucky enough to be on the right side of the first digital divide, find themselves on the wrong side of this second digital divide (Waddell, 1999). For example, a person who is blind may use a text-to-speech system that reads aloud text that appears on the screen. Because it cannot interpret graphics, it will simply say “image map” at a place where an image map would be displayed to someone using the full features of a multimedia Web browser. It cannot read aloud information within this and other graphic images. This person cannot access the content presented unless this content is provided in a text-based form.

## BACKGROUND

Section 504 of the Rehabilitation Act of 1973 mandated that qualified people with disabilities be provided with access to programs and services that receive federal funds. The Americans with Disabilities Act (ADA) of 1990 reinforced and extended Section 504, requiring that people with disabilities have access to public programs and services, regardless of whether or not they are federally funded. According to these laws, no otherwise qualified individuals with disabilities shall, solely by reason of their disabilities, be excluded from the participation in, be denied the benefits of, or be subjected to discrimination in these programs and services, unless it would pose an undue burden to do so. A United States Department of Justice ruling (ADA Accessibility, 1996) clarified that ADA accessibility requirements apply to programs offered on the Internet by stating, “Covered entities that use the Internet for communications regarding their programs, goods, or services must be prepared to offer those communications through accessible means as well.” Clearly, if qualified individuals with disabilities enroll in distance learning courses or are qualified to teach them, these opportunities should be made accessible to them. However, the inaccessible design of most Web-based distance learning courses imposes barriers to people with some types of disabilities (Schmetzke, 2001).

## UNIVERSAL DESIGN

If an applicant who is blind is the best candidate to teach a Web-based course which has been developed without text alternatives for critical content displayed using graphics, the course will need to be modified in order for him to teach it. If planning for access was done as the course was being developed, this costly redesign would not be necessary. Simple design decisions could have been made to assure accessibility to potential students and instructors with a wide range of abilities and disabilities. This proactive process is called “universal design”. Universal de-

sign is defined as “the design of products and environments to be usable by all people, to the greatest extent possible, without the need for adaptation or specialized design” (National Center for Universal Design, 2003, p.1). Applying universal design principles makes products and environments usable by people with a wide variety of characteristics, including gender, height, age, ethnicity, primary language, and level of ability to see, hear, speak, and move.

The concept of universal design was first applied to architecture. It has since been applied to the design of household appliances, instructional learning environments, Web sites and other products and environments (Bar & Galluzzo, 1999; Bowe, 2000; Burgstahler, 2001). When the wide range of characteristics of potential students and instructors is considered, distance learning course designers can create learning environments that are accessible to all participants, just as sidewalks with curbscuts are used by everyone, including those who push delivery carts, baby strollers, and wheelchairs.

For many years, examples of isolated distance learning courses designed to be accessible to individuals with disabilities could be found, including a course co-taught by the author of this article and a professor who is blind (Burgstahler, 2000). However, few distance learning programs have policies and guidelines that specifically address the accessibility of distance learning tools and resources (Burgstahler, 2000; Kessler & Keefe, 1999; Schmetzke, 2001). Comprehensive policies, such as the mandate that distance learning options offered by California Community Colleges must afford students with disabilities maximum access (Distance education: Access guidelines for students with disabilities, 1999), are rare.

## **EXAMPLES OF ACCESSIBLE DESIGN FEATURES**

To create Web pages that are accessible to everyone, developers must either avoid certain types of inaccessible features or formats or create alternative methods for navigating or accessing content provided through inaccessible features or formats (Thompson, Burgstahler, & Comden, 2003). For example, including <alt> attributes with descriptive text makes graphic image content accessible to individuals who are blind. Developers should also assure that all functions at a Web site can be accessed using a keyboard alone, so that those who cannot manipulate a mouse can navigate the pages using the keyboard or a keyboard alternative. Another useful feature is to add a “Skip Navigation” link to the top of each page; otherwise, most speech-to-text systems for individuals who are blind will read through all of the navigation links on a page before reading the content in the body of the page.

Students and instructors who have limited vision may use software that enlarges screen images, but allows them to view only a small portion of the content of a standard screen image at one time. Page layouts that are uncluttered and consistent from page to page can facilitate locating and understanding Web content for people with low vision, as well as for those with some types of learning disabilities. Assuring that content and navigation do not require that a viewer distinguish one color from another makes Web-based distance learning accessible to those who are colorblind.

Internet resources that do not require the ability to hear are accessible to people who are deaf or hard of hearing. However, when Web sites include audio output without providing text captioning or transcription, they cannot access the content. Similarly, distance learning programs should provide audio-descriptions (i.e., aural descriptions) of visual content or text-based descriptions for those who are blind.

Some distance learning programs employ real-time “chat” communication in their courses. In this case, students communicate synchronously (at the same time). Synchronous communication is difficult or impossible to use by someone whose input method is slow. For example, a person with limited hand use who can only type characters slowly or someone with a learning disability who takes a long time to compose his thoughts may not be fully included in the discussion. In contrast, with a synchronous tool such as electronic mail, all students and instructors can fully participate. In addition, since flickers at certain rates (often between 2 to 55 hertz) can induce seizures for people who are susceptible to them, they should be avoided.

## **Tools, Guidelines, and Standards for Accessibility**

The most current version of HTML (Hypertext Markup Language) makes it relatively easy to develop accessible Web sites. Commonly used development tools such as WebCT™(n.d.) and Blackboard™(n.d.) include accessibility tools as well. Electronic tools that can test Web resources for some accessibility features and training courses and reference materials to help distance learning designers develop skills for making distance learning programs accessible are also widely available (Disabilities, Opportunities, Internetworking, and Technology, n.d.).

Technical guidelines and standards have been developed to provide guidance to organizations that wish to make Web content accessible to students with disabilities. The most widely used are those created by the World Wide Web Consortium and the U.S. federal government.

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