Educational Accessibility to Technology

Taralynn Hartsell
The University of Southern Mississippi, USA

INTRODUCTION

In education, providing access to instructional materials and resources is important for any type of learning to occur. If students do not have access to the resources necessary for them to complete projects, perform research, retrieve data information, communicate with others, and so forth, then learning will be impaired. Universal access is a concept that describes the usability and accessibility to content and information by the largest range of people (Mills, 2006; Roblyer, 2006). Applied to the learning environment, universal design requires that the curriculum includes alternative methods for information access by individuals with different backgrounds, learning needs, abilities, and disabilities in various learning contexts. When this concept is applied to the design and development of Web pages, universal design is known specifically as Web accessibility. This overview discusses the importance of providing access to specific forms of computer and Internet technologies. In addition, the discussion will define technology accessibility (or universal access), why such access is needed, means of ensuring such access, and methods of evaluating accessibility.

BACKGROUND

Definition and Educational Role

Accessibility involves two key issues. The first is by investigating how users with disabilities (or without) access electronic information. The second issue is directed more toward Web designers in that they need to provide Web-based content to function with assistive devices or make the content available to everyone (Macromedia, 2007). When general computer use is concerned, certain operating systems such as Windows and Apple have integrated universal access features right into the system that learners can enable and use in conjunction with a variety of applications from the system itself and from other developers (Apple, 2006).

These features can create learning experiences that are appropriate for individual learners that would maximize their abilities to progress through the curriculum. Accessible Web sites, on the other hand, ensure that a smooth transformation exists between the information and services to guarantee that the content is easily navigable and understood. In a sense, accessible Web sites can be perceived, navigated, utilized (with a keyboard or any other device than the mouse), and easily understood and read (Usablenet, 2006). Web-enhanced learning should accommodate the needs of all learners by providing "easy resource selection and delivery, alternative pathways to information, connections to experts and mentors, access to a variety of materials, multiple ways to publish work, and placement of widely varying content in structured curricular frameworks" (Mills, 2006, p. 19). Thus, accessibility encompasses meeting the needs of all learners that may have visual, auditory, physical, speech, cognitive, and neurological difficulties (Web Accessibility Initiative, 2006).

Justification

Technology is increasingly more evasive in the lives of learners today. Computer technology and the Internet play an important role in information retrieval that is necessary to complete course-related work. In a larger scope, accessibility is essential for ensuring equal opportunity to all learners and assumes a social responsibility on the part of educational institutions to make the information available to the public (Web Accessibility Initiative, 2006). In addition, accessibility not only affects learners who have certain limitations, but also helps improve access to those individuals without disabilities. For instance, accessibility is built upon the concept that the Web and associated software should be flexible enough to meet the needs of many different learners, their particular preferences, and physical situations. Therefore, if a person has a very slow Internet connection or uses older technology, principles used in designing accessible Web pages (e.g., using text descriptions for images in case the user turns

them off for faster downloading) can help supersede low-bandwidth connection. Another example is when a person breaks an arm or shoulder and uses the speech-recognition software such as Dragon Naturally Speaking to temporarily assist with software applications. Thus, accessibility options can help all users whether they are disabled or not.

Finally, in relation to education, providing accessibility is required by law. Section 508 of the U.S. Rehabilitation Act mandates that all federal institutions that buy, develop, maintain, or use electronic and information technology must make these resources accessible to people with disabilities (Foley & Regan, 2005; Irwin & Gerke, 2004; WebAIM, 2006). Accessibility to computers, software, and electronic equipment such as faxes, copiers, and telephones must also be made available to individuals with disabilities. This act also applies to federal agencies that develop and design federally-funded Web sites (e.g., a college Web site). The standards under Section 508 address how different components of Web sites need to be designed to make the information more accessible. There are sixteen standards used to define Web accessibility that highly affect post-secondary institutions of higher learning because they are federally-funded. Another law that affects educators is the Individuals with Disabilities Education Act (IDEA). This act primarily affects general education classrooms in pre-K through 12 grade levels (Roblyer, 2006; Solomon, Allen, & Resta, 2003) in that special needs students must be accommodated with assistive technologies for augmenting their academic achievement. Thus, because laws direct educational institutions to provide accessibility, this is an important issue to consider during technology planning.

CREATING ACCESSIBILITY IN EDUCATION

Methods and Tools

There are many different tools that educational institutions can use to ensure accessibility. In regard to basic computer use, computer systems have embedded within their systems accessibility tools that provide access to content and software applications. Windows XP, for example, has many different accessibility wizards and options to help those with or without disabilities (Windows XP Accessibility, 2006). For instance, there is an Accessibility Wizard in Windows XP that can enable and disable certain options for different users. For those who are vision impaired, the Wizard allows learners to set options such as setting scrollbar functions and window sizes, using high contrast color schemes, and changing the appearance of the mouse cursor. Sound options can be set as well such as giving visual alerts to auditory impaired learners (e.g., SoundSentry) or by providing caption displays for speech and sound (e.g., ShowSounds). Finally, those with limited physical movement can adapt different types of key movement (e.g., StickyKeys) and adjust the cursor size, movement (e.g., ClickLock), and color options. Other useful features that can be adapted for Internet use in the Windows environment are formatting the Web pages to use a custom style sheet, selecting alternate colors for visited and unvisited links, and turning on or off the playing of animations, sound, and videos. A learner can also make adjustments to the taskbar, sound schemes, and utility managers, and initiate the onscreen keyboard, the use of a narrator and screen magnifier, and adjust the speech options such as text-to-speech.

For Apple users, there are several accessibility features that a learner can enable (Apple, 2006). Universal access features for the Mac OS X system includes vision, hearing, and motor tools for those who require them. Vision options include magnifying the screen or specific objects on the screen (e.g., Zoom) and adjusting the display characteristics to make content easier to read. Talking alerts and spoken items provide an audible method for obtaining feedback from the computer. Mac OS also includes a scalable cursor option to increase the size and appearance of the mouse cursor so that it will be easier to locate and follow. Hearing tools include Visual Alert that flashes across the whole screen to let the user know that a window or dialog requires attention. Physical/motor options include slow keys that prevent multiple keystrokes, using the numeric keys instead of the mouse, speech recognition or talking alerts, and modifying key repeats and delay rates on the keyboard. Thus, computer systems allow learners to amend and enable tools to help them gain access to the information.

In terms of making certain that Web pages are accessible, a designer needs to create features on the page that are accessible with any type of assistive technology used by a disabled learner (Moss, 2004). For instance, blind users may utilize a screen reader such as JAWS that reads the content on the Web page.

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