

Web Access by Older Adult Users

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INTRODUCTION

The older adult population in the U.S. continues to increase at a rapid pace due to aging baby boomers and increased life expectancy. Older Americans, 60 years and older, will comprise about 20% of the total population by 2030, which is more than twice the number of aging adults than in 2000 (Administration on Aging, 2002).

The Web offers an unprecedented opportunity for older adults to access a wealth of online resources. Increasingly, older adults are using the Web for information on self-diagnosis, treatment, and prevention of health problems (Preidt, 2003). They are taking advantage of electronic government resources to vote, file taxes, obtain social services, voice their opinions to officials, and search historical records. Older adults are also using the Web to stay socially active in terms of communicating with other users via lists and chat rooms (Czaja, Guerrier, Nair & Landauer, 1993; Kerschner & Hart, 1984).

Older adults are getting online by an estimated growth rate of 15% per year (Coulson, 2000). They log over eight hours of online time per week and visit more Web sites than persons in younger age groups when they are online (Morrell, Dailey, Feldman, Holt, Mayhorn & Echt, 2002). Their use of the Internet is predicted to increase as much as 358%, from 3.7 million users in 2001 to 17.3 million in 2005 (Scanlon, 2001).

Unfortunately, older adults may have trouble accessing a Web site because of design issues that impede its use. Barriers may be encountered due to a site's color scheme, font size and type, navigation, vertical screen length, image mouseovers, and sentence complexity, among others. In this information-rich society, many older adults will remain "information have-nots" unless these barriers are removed.

BACKGROUND

In the U.S., the Internet has emerged as a major communications medium with the potential to disseminate information to all citizens including older adults. Yet, there is an ongoing concern that the opportunities associated with Internet access may not be readily available to

all citizens. This concern has been expressed in a recent Pew Foundation study (Lenhart, Horrigan, Rainie, Allen, Boyce, Madden & O'Grady, 2003, p. 6):

"Internet non-users will have less power as consumers and fewer economic opportunities, less access to high-quality health information, fewer options for dealing with government agencies, no chance to learn about their world from the millions of organizations and learning centers that have posted their material on the Web, and less opportunity to interact with others through email and instant messaging."

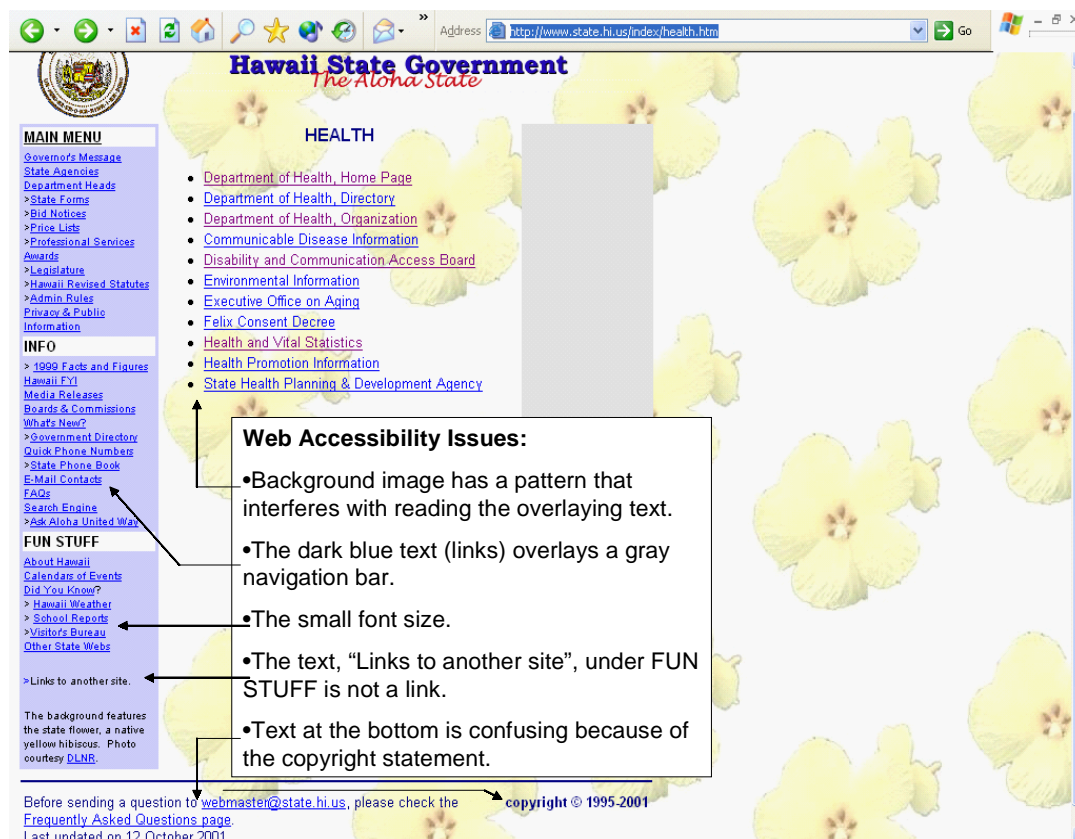
Older adults in particular may encounter Web accessibility barriers due to vision, cognition, and physical changes that are associated with the normal aging process. Reading complexity may also become a barrier when literacy skills of older adults are not taken into account in the design of Web content.

Vision

The aging eye has a reduced ability to focus on close objects due to a reduction in the elasticity in the lens. Other vision changes due to the normal aging process include: a decline in visual acuity, impacting the ability to see objects clearly, yellowing and thickening of the lens, impacting color perception, decreased light sensitivity, impacting adaptation to changes in light levels, increased sensitivity to glare from light reflecting or shining into the eye, and reduced depth perception, making it more difficult to judge the distance of an object (American Foundation for the Blind, 1999). These vision changes impact the use of the Web in terms of the legibility of written content on the page. They also impact searches, navigation, and reading speed and comprehension (Echt, 2002).

Figure 1 illustrates readability issues associated with a state government Web page when taking into account aging vision. The patterned background image may negatively impact readability, especially given the small size of the foreground text¹. The format of the text at the bottom of the page also impacts readability given that the sentence "Before sending a question to <webmaster>, please check the Frequently Asked Questions page" breaks to

Figure 1. Illustration of Web barriers and aging vision (<http://www.state.hi.us/index/health.htm>)



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The use of color can also impact the readability of information content on a Web page due to aging vision (refer to Becker, 2004a for a discussion on color and Web accessibility for older adults). For many older adults, foreground and background color combinations may render a Web page visually inaccessible. In Figure 1, the contrast between the text and background colors in the navigation bar may be insufficient for older adult readers. Figure 2 shows the New Mexico state government homepage with saturated colors for both the foreground and background. The edges of the text tend to blur when bright or neon colors are used in combination with saturated colors (e.g., bright yellow text displayed on a red background), thus reducing legibility of the text for many older adult users.

Cognition

Studies show that an older adult's working and spatial memory task performance declines with age (Holt & Morrell, 2002). As a result, an older adult may not be able

to discern details in the presence of distracting information. In addition, complex navigational schemes, nonintuitive searches and cluttered pages may impede use of a Web site because of declines in working and spatial memory.

Of 40 U.S. state government sites assessed, over 60% required traversing three or more screen pages to navigate directly to resources for older adults (Becker, 2004b). Less than 8% of these sites had a descriptive link on the homepage linking to senior resources. Those Web sites having nondescript links required trial and error searches for senior resources. This type of navigational complexity impedes the use of electronic government by many older adult users.

Physical Impairments

Older adults experience a decrease in motor coordination, and as such, may have difficulty with cursor positioning, precise mouse movement, and clicking on links (Chaparro, Bohan, Fernandez, Choi & Kattel, 1999; Ellis & Kurniawan, 2000; Hawthorne, 2000). Figure 2 shows a Web page that requires the precise use of mouseover technology in order

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