Preventing Societal Discrimination: Accessible Web Design for People with Disabilities

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Overview-types of assistive technology (AT)

- ## Assistive technology for communication
  - AKA augmentative communication (AAC)
  - Communication boards and devices
  - Proloquo2go on the iPhone

- ## Assistive technology for transportation
  - Power wheelchairs
  - Electronic prosthetics

- ## Assistive technology for access to information
  - Alternative methods for input/output to standard computer applications and web access (MY FOCUS)

What is Web Accessibility?

- People with various impairments or disabilities use different types of assistive technologies to access OS, applications, and web content
  - Screen readers (speech output)
  - Braille displays (tactile output)
  - Alternate keyboards or pointing devices (input)
  - Speech recognition (input)
  - Regular keyboard but no pointing device
  - Rely on captioning or transcripts

What is Web Accessibility?

- Web sites need to be flexible enough to work with various input/output/assistive technology devices

- Accessibility doesn't change the "look or feel" of a web site for someone without a disability

- Technical accessibility is in the back-end coding, it's not obvious by looking, whether a site is accessible

- Accessible DOES NOT mean text-only

What is Web Accessibility?

- It's not enough to say, "make it accessible," that's why you have design guidelines
  - Guidelines from Section 508 of the Rehabilitation Act
  - Web Content Accessibility Guidelines (WCAG) from the World Wide Web Consortium
- Other design guidelines exist, but they do not have legal power (like section 508) or international recognition (like WCAG)
- Section 508 web guidelines are based on (but not the same as) WCAG

Do these Guidelines Address Everyone?

- In reality, these guidelines mostly address perceptual and motor impairments

- People with perceptual and motor impairments want to access the same information, same web sites, same applications as other users, just using different I/O devices

- 30 year history of HCI research related to perceptual and motor impairment, much less research related to cognitive impairment – no interface guidelines currently exist for cognitive impairments

- Right now, it looks like future policy will also focus primarily on perceptual and motor impairments

What difference does it make?

- Inaccessible web sites lead to:
  - Employment discrimination
  - Lack of access to educational opportunities
  - Lack of access to reading materials
  - Inability to access markets and purchase goods and services (for online-only stores)
  - Potential pricing discrimination
  - Preventing people from forming communities
  - Inability to access information on preparing for emergencies (ready.gov)

Examples from
Three Recent Studies from the
Universal Usability Laboratory

Lack of Access to Government Information on the Web

Studies on federal web inaccessibility

- Only 60% of 100 Federal homepages were accessible (Jackson-Sanborn, Odess-Harnish and Warren, 2002)

- Only 13.5% of 148 Federal web sites were accessible (Stower, 2002)

- Only 22% of 50 Federal homepages were accessible (Ellison, 2004)

- Only 23% of 417 Federal web sites were accessible (Loiacono, McCoy, & Chin, 2005)

- All of those studies used automated tools, Jaeger (2006) used a multi-method approach to evaluate 10 Federal web sites, all 10 violated Section 508

Evaluating Federal Home Pages

- In April and May 2010, we evaluated 100 Federal home pages for Section 508 compliance

- Includes 80 executive branch sites, 2 judicial branch sites, 8 legislative branch sites, and 10 open government sites (taken from usa.gov)

- Each site was evaluated by:
  - Expert human inspection using a structured method
  - Two different automated evaluation tools

Results of Federal Home Page Inspections

- 96/100 federal home pages had violations according to human inspection (avg. 2.27 guidelines violated per site)

- 92/100 federal home pages had violations according to automated inspection (avg. 2.06 or 2.14 guidelines violated per site)

- Common problems:
  - No skip navigation
  - Graphics, forms, and flash without markup
 - Links with meaningless names (1,2,3,4, click here)

Federal Web Site Accessibility Statements

Of 100 Federal web sites examined	%
Have an accessibility statement	58%
Statement says "we are 508 compliant"	42%
Statement describes specific accessibility features available on the web site, e.g. *"At the top of most web pages on our site, there is an invisible link to a text-only version of the page."* from nsf.gov	22%
Statement describes the tools that have been used to test the site for accessibility, e.g. *"The site has been tested using IBM Home Page Reader and JAWS for Windows"* from usaid.gov	3%
Describes the process that they use to develop or ensure accessibility compliance, e.g. *"The Data.gov site is routinely tested for compliance with Section 508 of the Rehabilitation Act using a technical standards check-list, in-depth testing with screen readers, policy experts, and person with disabilities."*	2%
Describes how often the site is checked for compliance, e.g. *"The site is also reviewed on a monthly basis using Watchfire WebXM to identify instances that fail to meet one or more of Section 508's 16 compliance standards"* from recovery.gov	2%

Well-publicized violations of Section 508

- www.whitehouse.gov had accessibility problems through early 2010

- www.ready.gov (sponsored by FEMA) in 2010 had information on the homepage about flood and hurricane preparedness that was inaccessible to blind users (improved in late 2010)

- When www.section508.gov was re-designed in July 2010, the site itself was not 508-compliant

Example from www.whitehouse.gov
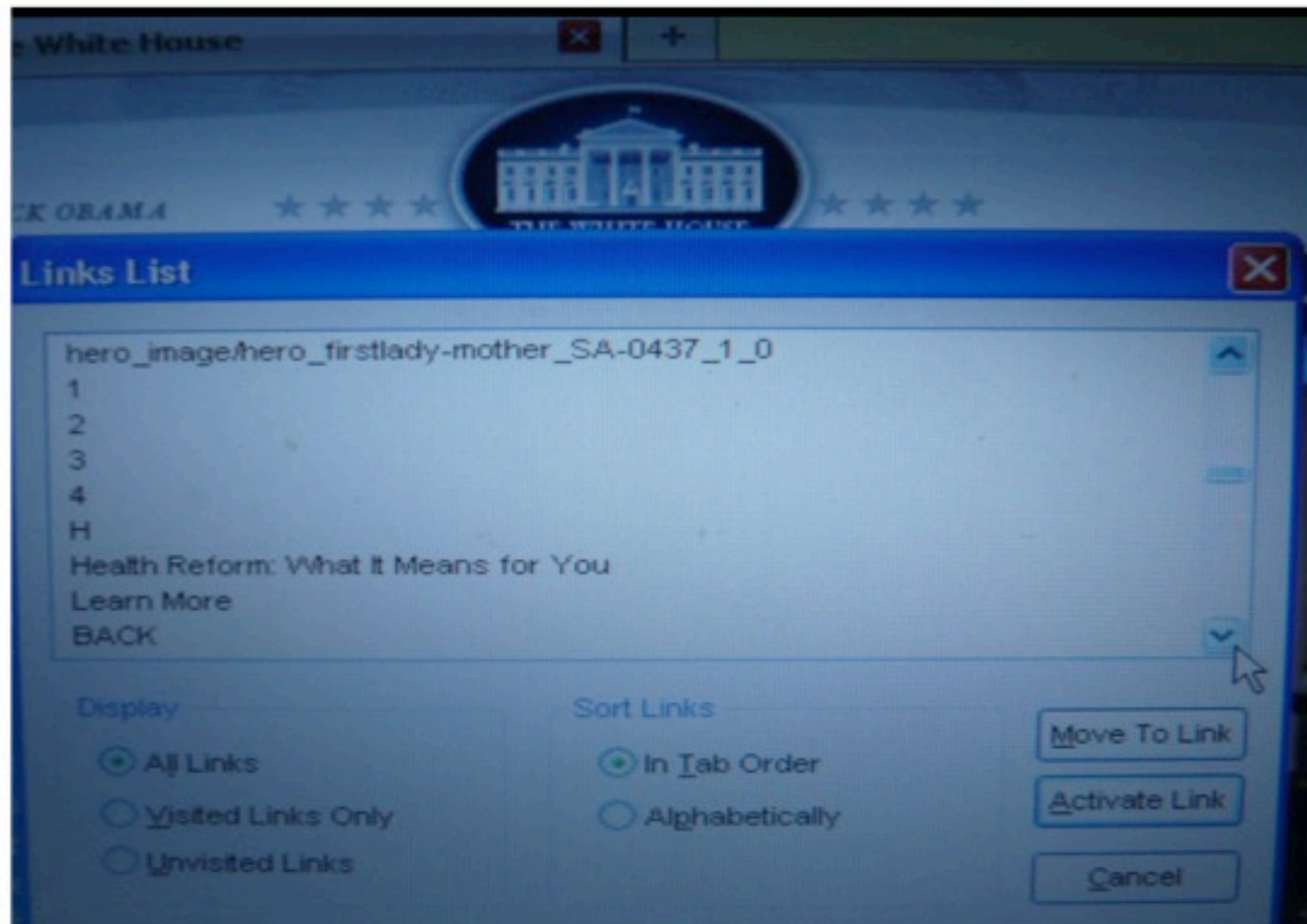
Example from www.ready.gov

# Pricing Discrimination by Airlines due to Inaccessible Web Sites

Airlines and Web Accessibility

- There has been a Dept. of Transportation regulation in effect since May 2009 (issued in May 2008)
- An airline is not required to have an accessible web site, but if the site isn't accessible, then:
  - Customers can call the airline, receive the lowest fare available on the web site at that time, and
  - Will not be charged a call center fee
- We did an accessibility inspection of the web sites of the 10 largest airlines: Alaska, JetBlue, United, and USAirways were inaccessible

Common accessibility problems

- Information appeared in inaccessible pop-ups

- Information only available through mouseovers, not keyboard
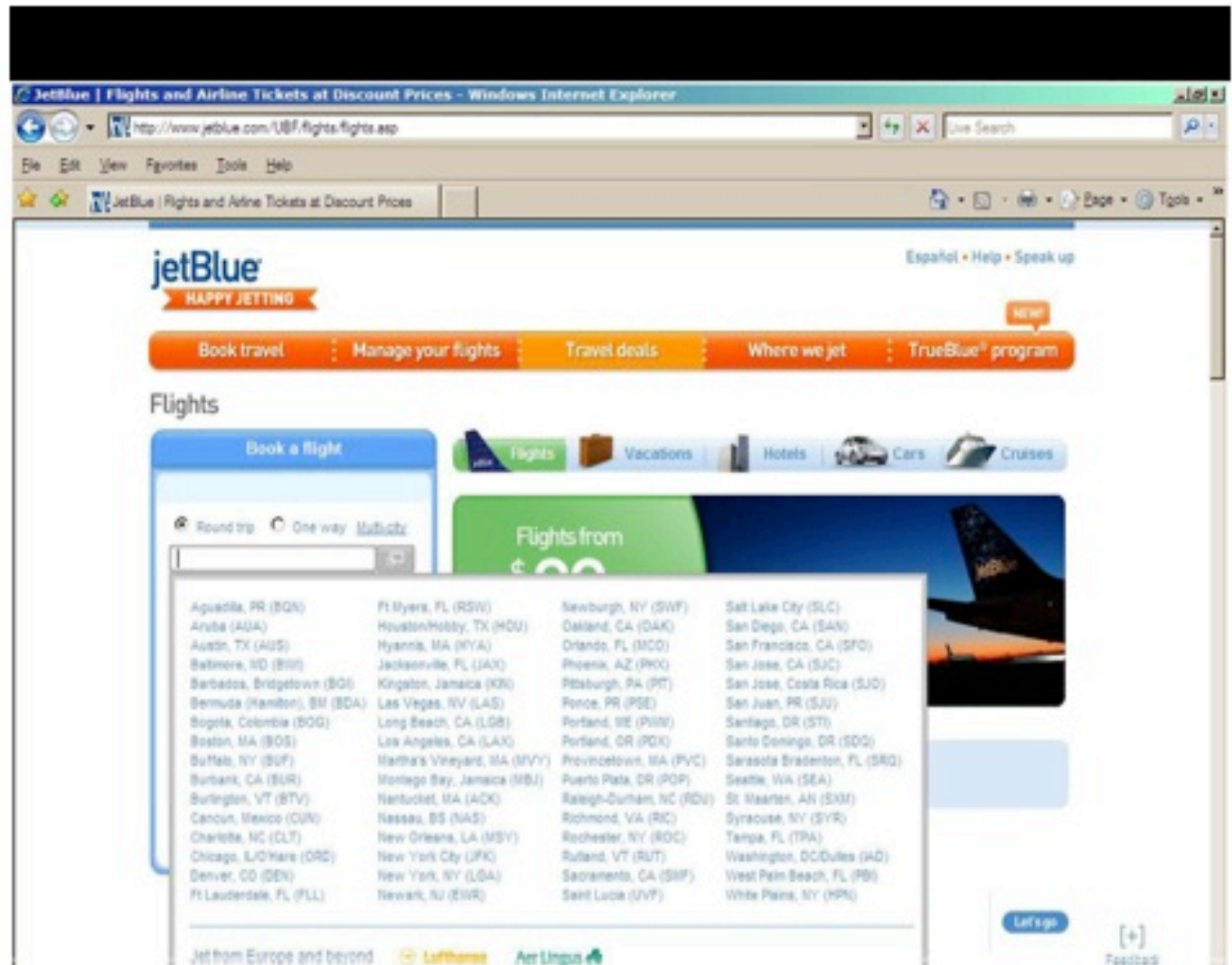
Research methodology

- Did a pilot study (one phone call per airline)
- Created 60 travel itineraries (15 per airline) involving:
  - A specific date, depart/arrival city, and approximate time
  - Dates/times/cities were chosen so that, when a phone call was made, there was only one flight that fit the criteria
  - All were round trip itineraries, direct flights, within the US, and did not involve overnight flights

Research methodology

- One student called the airline, identified themselves as blind, and noted the DOT regulation, and asked for a schedule information and a price quote

- The other student repeatedly checked the current web price for the flight

- The goal was to find out if the airlines complied with the regulations, by offering the same price on the phone and waiving the call center fee

Results of 60 phone calls to airlines

	Charged a higher fare	Refused to waive the call center fee	Rate of failure to comply
Alaska	0	2	13.3%
JetBlue	1	0	6.7%
United	0	5	33.3%
USAirways	2	5	40%/46.7%

Result: Two airlines (United and USAirways) practiced discriminatory pricing at least a third of the time

Employment Discrimination due to Inaccessible Online Applications

Accessibility of Online Job Applications

- Most jobs now require an online application
- If online employment applications are inaccessible, this shuts people with disabilities out of the job before they can even apply
- Historically, the unemployment rate for people with disabilities is high
- We had 16 blind users attempt to apply for jobs using online employment applications
- Project funded by the SE DBTAC and Burton Blatt Institute

Results

- 16 southeastern employers were selected, 2 online applications submitted per employer

- 24/32 applications were submitted, HOWEVER

- Only 9/32 attempts at applying for a job online could be completed without assistance from the researchers

- Some participants needed as many as 3 interventions

- In usability testing research, this would be considered a task success rate of **28.1%**

PNC Bank

- The "search jobs" page was flash-based, with no textual equivalents, so unless you could use a mouse pointer, you could NOT search for jobs
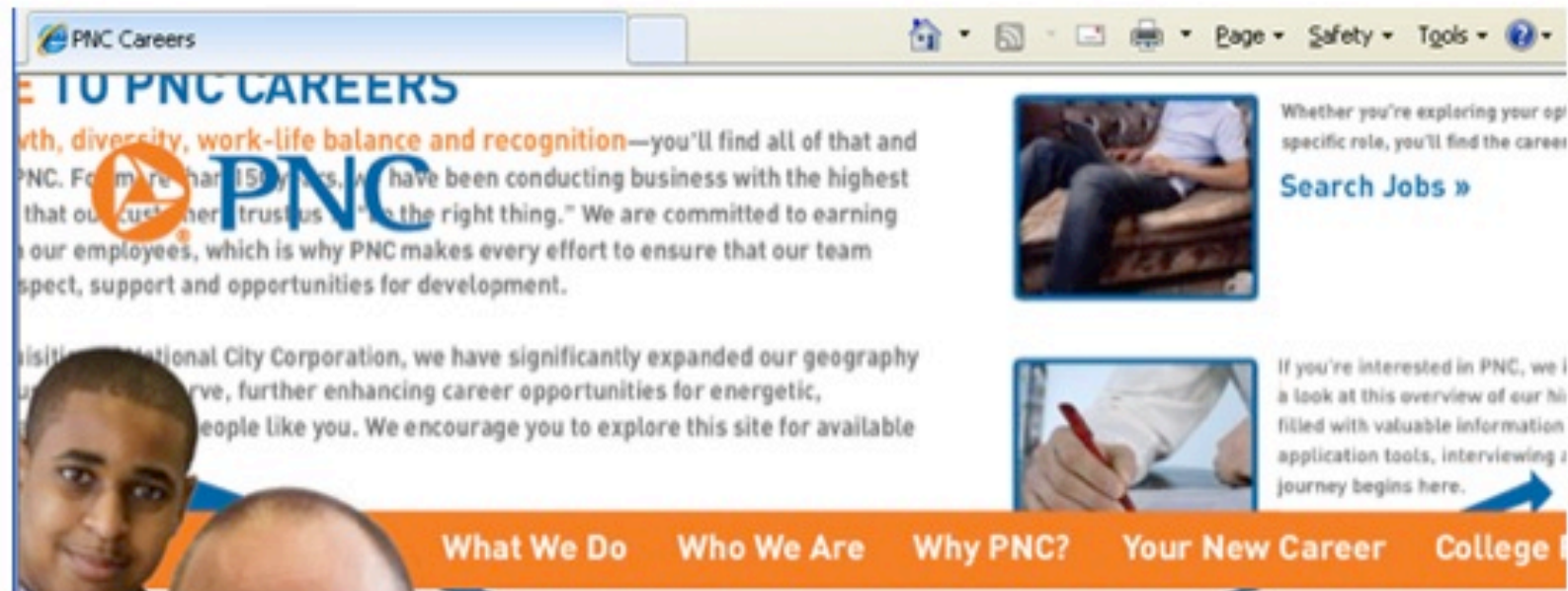
Smithfield Foods

- To find out more about jobs, you were required to click on maps to select where you wanted to find a job, but there were no textual equivalents, so mouse usage was required

Choose your region:

USA

Europe

Go Back

Mexico

Progress bars provide no useful feedback

- They need to also provide information non-visually about how the user is progressing

Potential Causes of Web Inaccessibility

- Developers don't understand accessibility
- Contracts often don't require accessibility
- DOJ didn't perform their required enforcement activities for nearly a decade
- Government agencies don't release any data about accessibility
- Automated tools can only provide limited feedback
- Policymakers don't realize the implications of inaccessible web content
- Universities rarely teach about IT accessibility

Looking Forward:
The next two months and the next few years

Coming later in 2011…

- In November, the AIM Commission will be submitting their report to Congress on accessible instructional materials in post-secondary education

- In late November, the US Access Board will be releasing a new draft version of the "508 refresh" and starting a new ANPRM

- On November 25, feedback is due on the SNPRM on the accessibility of airline web sites and kiosks

- In December, the White House will be releasing their comprehensive plan on how to improve Section 508 compliance

More action on IT accessibility in higher ed

- June 29, 2010 letter sent to all university presidents in the US, sent by
  - Office for Civil Rights of Dept. of Education
  - Civil Rights Division of the Dept. of Justice
- Requiring only accessible technology be used in classrooms and instruction, under ADA and 504
- Updated DOE guidelines issued May 2011
- Administrative compliant filed in 2010 against Penn State (resolved in Oct 2011)
- Lawsuit filed against Florida State (June 2011)
- DOJ investigation request: NYU and Northwestern for using inaccessible Google Apps (March 2011)

ADA is changing, too!

- In July 2010, the DOJ issued an advance notice of proposed rulemaking

- To "establish requirements for making the goods, services, facilities, privileges, accommodations, or advantages offered by public accommodations via the Internet… accessible to individuals with disabilities"

- Public comment period closed in January 2011

- ANPRM Questions related to:
  - Which guidelines (WCAG or Section 508)
  - Content that has not been recently updated
  - Performance standards vs. technical standards
  - Timeframes

- This is still in process

Web accessibility is technically possible. It's not hard. But better policies and processes need to be put into place.

Questions? Comments?