

# Making the GRADE Improving Access to E-Learning

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## Objectives

- Identify 3 barriers for users with disabilities to web sites.
- State 2 benefits of universal web design.
- Describe 3 resources to improve usability and integrate accessibility in web design.

## Southeast Disability and Business Technical Assistance Center

➤ One of ten regional ADA and IT centers funded by the National Institute on Disability Research and Rehabilitation, U.S. Department of Education.

➤ Contact Your Southeast DBTAC

800-949-4232 (v/tty)

Web: [www.sedbtac.org](http://www.sedbtac.org)

Email: [sedbtacproject@coa.gatech.edu](mailto:sedbtacproject@coa.gatech.edu)

## Southeast DBTAC Mission

- Facilitate voluntary compliance with the Americans with Disabilities Act of 1990 (ADA).
- Facilitate widespread use of accessible electronic and information technology (IT) in education.

## States Served by Southeast DBTAC

- Alabama
- Florida
- Georgia
- Kentucky
- Mississippi
- North Carolina
- South Carolina
- Tennessee

## FLASH ... Quick Quiz for Distance Education Accessibility

Source: NCDAE, 2005

### Question 1

- What percent of postsecondary institutions that offer distance education use the Internet as a primary means of distance education?
  - A. 28%
  - B. 52%
  - C. 65%
  - D. 90%

### Question 2

- What percent of postsecondary institutions that offer distance education receive requests from students with disabilities for accommodation?
  - A. 12%
  - B. 48%
  - C. 71%
  - D. 97%

### Question 3

- What percent of postsecondary institutions have a single home page that would be considered accessible for students, staff, and community members with disabilities?
- A. 82%
  - B. 66%
  - C. 24%
  - D. 9%

### Question 4

- Web accessibility is ...
- A. An important idea but is not yet a requirement for postsecondary education.
  - B. A new concept that is gaining local “requirement-status” because some institutions are writing policies to improve student access.
  - C. Required by the ADA.
  - D. Required by several federal statutes and many state statutes.

### Question 5

- Web developers cite which of the following the most when asked why they do not design accessibility ...
- A. I wasn't aware of the problem.
  - B. It will hinder the look/feel and functionality to make it accessible.
  - C. I don't know how to do this.
  - D. There is no budget to purchase accessibility software.
  - E. All of the above.

### Question 6

- The accessibility error that accounts for almost 90% of all errors on the Web is ...
- A. The presence of Flash applications.
  - B. Inaccessible PDF files.
  - C. Graphics and other images.
  - D. Lack of captions for multimedia.

### Question 7

- The percentage of postsecondary institutions that have Web accessibility policies in the United States ...
- A. 13%.
  - B. 44%.
  - C. 67%.
  - D. Unknown.

### Question 8

- The postsecondary institutions that have made successful transitions to accessible Web sites have...
- A. Policies that are monitored and provide help for staff.
  - B. Lots of students with disabilities.
  - C. A budgetary line item to cover accessibility.
  - D. Once had a big ticket blind donor.

# What is Disability?

## ➤ Hidden

- Blind/Low Vision
- Deaf/Hard of Hearing
- Physical/Mobility
- Cognitive
- Neurological

- Learning Disability
- Head/Brain Injury
- Psychiatric
- Health/Medical

## ➤ Environment

## ➤ Technology

## ➤ Temporarily able-bodied

## ➤ Attitudes are the real disability: people first!

## Disability Statistics 18-24 yrs.

- 7% of the population

## Disability Statistics 25-34 yrs.

- 9% of the population

## Disability Statistics 35-44 yrs.

- 15% of the population

## Disability Statistics 45-54 yrs.

- 20% of the population

## Disability Statistics 65-74 yrs.

- 37% of the population

## Disability Statistics 75+ yrs.

- 59% of the population

## Individuals with Disability and Computer Access

- 49% report the Internet changed their life.
- Spend 2x as many hours online and using email.
- Over 50% use computer for educational applications.
- Largest niche of online buyers.

## Students with Disabilities in K-12

- One of every twelve students (or 5.2 million students) in U.S. has some form of disability.
- Enrollment in special education grew twice as fast as overall school enrollment.
- Percentage of students with disabilities graduating from high school with diploma risen steadily in recent years.

Source: U.S. Census, 2000

## Students with Disabilities in Higher Education

- Number of college freshmen with a disability has more than tripled over the last twenty years (3% in 1978 to over 9% in 1998).
- One in eleven (or, 154,520) first-time, full-time freshmen entering college self-reported a disability of hearing, speech, orthopedic, learning, health-related, partially sighted or blind, or other conditions (HEATH, 1999).
- Nearly all public postsecondary institutions enroll students with disabilities (about 98% in 1998).
- 31% of participants with Specific Learning Disabilities (SLD) indicated their disability was first identified at the postsecondary level. (Source: NCSPEs, 2002)
- When declaring a primary disability, 44% of the participants with attention deficit disorder (ADD) indicated their disability was first identified at the postsecondary level.  
(Source: NCD People with Disabilities Postsecondary Education, 2003)

## Power of the Web

“... is in its universality. Access by everyone, regardless of disability, technology, or environment is an essential, integral aspect of life.”  
Source: Tim Berners-Lee, W3C Director, Inventor of Web

## Business Case for Web Access: Make/Save \$\$\$

- More people using your site; tap into affluent niches. i.e. Silver Surfers, PDAs, cellphones.
- Positive, free publicity; socially responsible; standards compliance.
- More search engine friendly = higher rankings. Google is largest "blind user" on Web.
- Easier to manage; separate content from presentation.
- Avoid potential litigation.

## Business Case for Web Access: Better Usability

- What usable often required for access.
  - Font adjusts: convenient, varying screens, low vision
  - Keyboard shortcuts: productivity, users without mouse
- Usability redesign: 100% increase sales/conversion
- Captioning helps language and learning
- Compatibility across technology versions
- More effective from start vs. scramble-fix
- Decreased download time

## Laws and Standards for Accessibility

- Federal Law
  - Americans with Disabilities Act
  - Section 508 of the Rehabilitation Act
- State Law [www.ittatc.org/laws/state\\_prototype.php](http://www.ittatc.org/laws/state_prototype.php)
- Standards and Guidelines
  - W3C Web Content Accessibility Guidelines
  - IMS Guidelines for Developing Accessible Learning Applications  
[www.imsglobal.org/accessibility/accessiblevers/](http://www.imsglobal.org/accessibility/accessiblevers/)

## Americans with Disabilities Act (ADA)

- Passed 1990 before Internet.
- Disability if meet one of three-part definition.
- Title II “Effective communication” applies to Internet per Department of Justice.

[www.adabasics.org](http://www.adabasics.org)

## Section 508 of the Rehabilitation Act

- Federal departments must:
  - Accommodate employees with disabilities.
  - Design accessible websites.
  - Procure accessible information technology.
- Interpreted applicable to state entities, including public colleges and universities.

[www.section508.gov](http://www.section508.gov)

## Web Content Accessibility Guidelines (WCAG)

- World Wide Web Consortium (W3C)
- 1.0 current; 2.0 due this year.
- 3 voluntary compliance levels
  - A- Level 1
  - AA – Level 2
  - AAA – Level 3

[www.w3c.org/WAI](http://www.w3c.org/WAI)

## Section 508 to ADA and WCAG

- If 508 adopted as policy:
  - For ADA: likely demonstrate compliance with “communication” requirements.
  - For W3C WCAG: likely meet minimum Level A, Priority 1 of which 508 was based.

## Accessibility Guidelines for Distance Learning

### Developed by: GRADE Project and MERLOT

- Format: Must, Should, May
  - PDF Files
  - Excel Documents
  - Flash Applications
  - PowerPoint Files
  - Video and Media
  - Word Documents

[www.catea.org/grade/guides/introduction.php](http://www.catea.org/grade/guides/introduction.php)

## Breaking Down Barriers, Barriers to Access

- Generally occur when information technology is not designed to interact with assistive technology.

## Mouse Only Commands

- Inaccessible to users not using a mouse due to disability or environment:
  - PDA
  - Cell-phone
  - Other mobile and web-enabled devices
  - Keyboard
  - One-hand, hands-free

## Touch Screens

- With no tactile or auditory feedback, touch screens cannot be used by a person who is blind, has low vision, or other sensory deficit (i.e. diabetic neuropathy)

## What is Assistive Technology (AT)?

- Assists a person with a disability in performing a task that most people can do without such technology.  
[www.assistivetech.net](http://www.assistivetech.net)

## Voice Activated Software

- Allows a person who cannot use a keyboard to enter in text.

## Trackballs and Touch Pads

- Allows a person who lacks the dexterity to use a mouse to move around the computer screen.

## Magnification Software and CCTV

- Allows a person with low vision to increase page size up to 8x.

## Braille Display/Refreshable Braille

- Translates text and system controls into Braille for a person who is blind or has low vision.

## Operating System Features

- For Windows 2000+, access by: Start > Programs > Accessibility >
  - Accessibility Wizard
  - High Contrast
  - ShowSounds
  - Serial Keys
  - Mouse Keys
  - Keyboard:
    - Sticky, Bounce, Slow, Repeat

## Screenreaders

- Translates text and system controls into speech for a person who is blind or has low vision.

## Hearing is Seeing ...

- Screenreaders
- Get
- Information
- One
- Word
- At
- A
- Time
- And
- By
- Viewing
- Links
- Or
- Headings
- In
- Page.
- Click here
- Click here
- Click here
- Document
- Here
- Download

## Reading Order of Tables

Screen	readers	read
information	across	tables
in a	linear	way
thereby	making	it
difficult	to	understand
information	contained	in tables.

## Example of Screenreader View of Table

➤ “There is a 30% chance of Classes at the University of rain showers this morning, Wisconsin will resume on but they should stop before September 3rd. the weekend.”

There is a 30% chance of rain showers this morning, but they should stop before the weekend.	Classes at the University of Wisconsin will resume on September 3rd.
--	--

## How are these seats different?

- ... In the mark-up.
- Same applies to UNIVERSAL DESIGN of web sites

## Universal Design (UD)

- Design of products, environments, and \_communications to be usable by all people, to the greatest extent possible, without need for adaptation or specialized design.
- AKA: Design for All, Inclusive Design, Lifespan Design

## Principals of Universal Design

- Equitable and flexible use.
- Simple, intuitive to understand.
- Communicates effectively.
- Minimizes hazards and consequences.
- Low physical effort.
- Size, space for approach and use.
- Inclusive community and interaction.

Source: Connel et al, 1997

## UD to Accessibility and Usability

“Built-in design that makes the learning goals achievable by individuals with wide differences in their abilities to see, hear, speak, move, read, write, understand English, attend, organize, engage, and remember.”

Source: Council for Exceptional Children (CEC)

## Example Module: Federal Court Concepts

- Public website in HTML at [www.catea.org/grade/legal/](http://www.catea.org/grade/legal/).
- 12 webpages of basic information on:
  - Structure of the federal courts.
  - Kind of cases that federal courts hear.
  - How to use federal court decisions in research.

## Module Design: Federal Court Concepts

- Designed from start with accessibility in mind.
- Created to showcase best practices of accessible design from GRADE research.
- Uses common components such as images, PowerPoint slides, Excel charts, web links, PDF file.

## Module Listed In ...

- National Council for Social Studies website.
- Federal Resources for Educational Excellence.
- Georgia Department of Education for Georgia civics and government educators.
- [Education World](http://www.educationworld.com/awards/2004/r1204-03.shtml) with A+ rating review. (www.educationworld.com/awards/2004/r1204-03.shtml)

## Phases to Create Accessible Module

1. Framework
  2. Content Development
  3. Design: Template and CSS
  4. Add Content and Make Alternate Formats
  5. Evaluation, Validation, Compliance
- Paper: [Closing the Circuit: Accessibility from Ground Up](http://www.sedbtac.org/ed/edpublications/index.php?id=114)  
www.sedbtac.org/ed/edpublications/index.php?id=114

## Phase 1: Framework

Who?	What?		
Why?	5 W ?s Centered around Goals & Objectives		Where?
	When?	How?	

## Phase 1: Framework – Module Goals

- Training tool for Southeast DBTAC affiliates, especially new ADA caselaw.
- Use in high school or post-secondary courses on civics or introductory political science.
- Example of accessible, attractive, usable module design process.
- Putting research into practice.

## Phase 1: Framework – Why?

- Do “lit review” to determine if need or reinvention of wheel.
- Found 5 modules with similar content, but:
  - All had access issues for individuals with disabilities.
  - None presented all relevant information in an easily understood manner.

## Phase 1: Framework - Who?

- Content: Subject Matter Expert
  - Some experience designing web content helpful. For this module, Curtis Edmonds, J.D.
- Support: Web or Instructional Designer
  - Design support and 2nd eyes to evaluate content; have some familiarity with accessibility.

## Phase 1: Framework - When?

- Timeline for development and launching, including testing and editing.
  - Module developed over a month.
  - Commitments to other projects caused development on “ad hoc” piecemeal basis.

## Phase 1: Framework - How?

- Cut and paste from Word into web authoring tool.
- Format by hand.
- Use Illinois Office Web Publishing Wizard.
- Use WYSIWYG authoring tool
  - [HTML Kit](http://www.chami.com/html-kit/) [www.chami.com/html-kit/](http://www.chami.com/html-kit/)
  - [Macromedia Dreamweaver MX](#)
- Compliance to laws, standards, principles of web accessibility.

## WYSIWYG Authoring Tools

- Many tools create “bad” or “junky” code, i.e. Frontpage, “Save As Webpage”.
- Other tools build-in or prompt “good” code, i.e. [Dreamweaver MX](#) thru Edit > Preferences >

## Readability, Context, and Alternate Format

- According to a research at Cambridge University, it doesn't matter in what order the letters in a word are, the only important thing is that the first and last letter be at the right place. The rest can be a total mess and you can still read it without problem. This is because the human mind does not read every letter by itself, but the word as a whole. Amazing huh!

## Writing for Web

- Different than paper; each page independent.
- Define acronyms and abbreviations.
- Concise, “quick-to-read” chunks.
- Hierarchical content organization.
- Use standard fonts and sans-serif. i.e. Arial, Verdana, Tahoma
- Provide alternate formats.
  - Large print: minimum 18 pt.; preferred 22 pt.

## Phase 2: Content Development

- Foundation on which design is built.
- If content exists, perform “**document tree**” using outline or **common HTML tags** to id structure.
  - i.e. headings, list, link, paragraph
- Develop in Word, web authoring tool, or “cut-n-paste” between both.

## Links

- Inform user if opening a new window
- Identify file type and size of links to non-web files in link and provide link to download necessary software.
  - i.e. My File ( PDF , 35 KB)
- Separate adjacent links with printable characters (surround by spaces) to improve readability, target area.
- Provide distinct link text so cues reader and makes sense if read out of context (list of links).

## Unfair Hearing Test

- 10 words each preceded by a number as heard by person with hearing loss.  
Source: League for the Hard of Hearing

## Words of Unfair Hearing Test

1. Catch
2. Fill
3. Thumb
4. Heap
5. Wise
6. Fish
7. Wedge
8. Shows
9. Bed
10. Juice

## Multimedia Captioning

➤ Types: Closed - Open - Real time

➤ Benefits:

- English as second-language.
- Different learning styles.
- Quiet/noise-free, shared environments.
- Searchable, printable, and markable reference.

## [Example of Captioning Video](#)

Source: Fluid Mechanics Course, [www.catea.org/grade/mecheng/](http://www.catea.org/grade/mecheng/)

## Captioning Tools

➤ Common, free software:

- Windows Media On-Demand Producer (WMODP).
- Media Access Generator (MAGpie)

➤ File formats need certain software to play or edit:

- MOV files (Quicktime)
- RM files (Real Player)
- ASF and WMV files (Windows Media Player)
- MPG and AVI files playable by most

## Audio Description (AD)

➤ Verbal description of key visual elements in media inserted into natural pauses in audio of the media.

➤ Used by individuals who are blind or visually impaired.

➤ Types: Closed - Open - Real time

➤ AKA “Descriptive video, video description”

## Images

➤ Alternative-text (alt-text) #1 solution

➤ Provide same info by context

- For picture of letter entering mailbox, best alt-text = “Mailing address”.
- For a logo of site, Federal Court Concepts, best alt-text = “Federal Court Concepts”.

## No alt-text = No understanding

➤ When images lack alt-text, the image filename (i.e. kwajex.gif) or gibberish of file types (i.e. inline, inline, link, embed, link, inline) are displayed to the user.

## Code for Alt-text of Images

```

```

## Null/Empty alt-text

- Do not describe decorative or spacer images as annoys and confuses users.
  - Bad: no alt-text; alt="right green corner"
- Leave empty for voice-enabled technology to ignore and not display in text browsers.
  - Good: alt=""

## Bullet alt-text

- Avoid describing color or shape of bullet and repeating info of surrounding text as annoys and confuses users.
  - Bad: alt="Arrow On" ; alt="Bullet"; alt="Information" Information
- Use asterisk in place of bullet description.
  - Good: alt="\*"; alt="" Information

## Testing of alt-text and reading order:

- Test using:
  - [WAVE](http://wave.webaim.org/) <http://wave.webaim.org/>
  - [Lynx](http://www.yellowpipe.com/yis/tools/lynx/lynx_viewer.php) [www.yellowpipe.com/yis/tools/lynx/lynx\\_viewer.php](http://www.yellowpipe.com/yis/tools/lynx/lynx_viewer.php)
  - Screenreader
- Examples:
  - Graphic, Text view (using Lynx), WAVE analysis, and Linearized (remove tables) view of the [Federal Court Concepts](http://www.catea.org/grade/legal/) Web Site from [www.catea.org/grade/legal/](http://www.catea.org/grade/legal/)

## Length of Alt-text

- Holds 255 characters but use maximum of 150 characters for access by all browsers.
- But, what if highly detailed like logo or collage or photograph?

## Long Description

- Use "longdesc" attribute of IMAGE tag for detailed images or graphs; goes to webpage describing the image.

```

```

## Additional to Long Description

- Many browsers and AT do not support “longdesc”.
- Use a [d-link \(example\)](#) or another way to access long desc.
  - Link around image to page with description  
–assistivetech.net      www.assistivetech.net
  - Caption below image  
–Design Lifespan Course [www.catea.org/grade/lifespan/](http://www.catea.org/grade/lifespan/)

## Interface Design

### Examples of Images As Seen By Common Visual Disabilities

- Macular Degeneration
- Cataracts
- Diabetic Retinopathy
- Tunnel Vision
- 20/200 Legally Blind View of Software
- Aging/Cataract View of Software

### Phase 3: Template and CSS

- Develop header, logo, navigation, and footer areas.
- Offer color contrast.
- Provide alt-text for images.
- Create a cascading style sheet (css).
- Insert skip-navigation link.
- Identify language of document.
- Test and correct as needed for accessibility.

### Template and Cascading Style Sheet (css)

- Document associated with a webpage that holds the look and feel of the webpage.
- Separates content from presentation.

### Benefits of Template and CSS

- Ensures all pages consistent look and feel.
- Saves time and money in coding and editing design and formatting for all webpages .
- Standards require; resolves most accessibility and usability issues ahead of time.
- Results in faster download.
- Allows flexibility to user view (color,size,font, screen).

### Examples of cascading style sheet in action

- [CSS Zen Garden](http://www.csszengarden.com)      [www.csszengarden.com](http://www.csszengarden.com)
- [Glasgow Museums](http://www.glasgowmuseums.com)      [www.glasgowmuseums.com](http://www.glasgowmuseums.com)
- [Federal Court Concept \(alternate view\)](http://www.catea.org/grade/legal/accessibility.html)      [www.catea.org/grade/legal/accessibility.html](http://www.catea.org/grade/legal/accessibility.html)

## Tips for Interface Design

- Consistent, logical from page to page.
- Use “expected” conventions.
- Larger buttons and icons.
- Avoid excessive use of graphics.
- Last resort make a text-only page.
- Ensure contrast between background and content.

## More Than Color

- Use to highlight focus, increase aesthetic appeal.
- Ensure color alone is not required.

Bad: Information in red is required. Push the green button to start.

Good: \*Required information in red with asterisk.

## Test Color and Contrast

- Print black and white.
- View in gray-scale.
- Use [Vischeck Color Blindness Tool](http://www.vischeck.com). [www.vischeck.com](http://www.vischeck.com)

## Examples of Testing Color Using Vischeck

- Red/green color blindness
- Blue/yellow color blindness

## Animation Flicker Rate

- Flashing images annoying.
- Can cause seizures for users with photosensitive epilepsy.
- Seizures can occur if exposed to flashing images between 4 to 59 hertz (flashes per second).

## Test the Animation/Flicker Rate

- If you do not have photosensitive epilepsy, example of flickering rate: [www.cinema.ucla.edu/strobe/](http://www.cinema.ucla.edu/strobe/)
- Illustration of flickering standards: [http://ncam.wgbh.org/richmedia/media/flicker\\_demo.html](http://ncam.wgbh.org/richmedia/media/flicker_demo.html)

## Other Interface Features

- Reinforce “Where am I?” by bolding text of current page vs. making a link.
- Add a [glossary and link to instances in text \(example: Federal Court Concepts\)](#).
- Develop [alternative view for more flexibility \(example: Federal Court Concepts\)](#).

## Navigation Design

- Avoid JavaScript or Flash for menus.
- Give reasonable time and alert if timed.
- Offer consistent, logical, ready-placement.
- Offer site map and contact / help information.
- Provide accessibility and site features information.

## Mouse Only Commands

- Inaccessible to users not using a mouse due to disability or environment:
  - PDA
  - Cell-phone
  - Other mobile and web-enabled devices
  - Keyboard
  - One-hand, hands-free

## Timed Responses

- Difficult for people with mobility, low vision, cognitive, and hearing disabilities as well as slow connection
- Inform user and offer option for extended time

## Skip-Navigation Link

- Permits users to skip repetitive navigation links and directly access the content.
- Supports keyboard-only access and logical tab order to navigate information.
- Specifically required by Section 508.

• [Example of skip-nav link](http://www.catea.org/grade/legal/): [www.catea.org/grade/legal/](http://www.catea.org/grade/legal/)

## Evaluation and Repair

- Check and repair errors in:
  - Style sheet.
  - Coding.
  - Color and contrast.
  - Accessibility standards (W3C, 508).
- User Testing

## Test Browsers and Operating Systems

- View in text-only browser.
  - Lynx Viewer [www.yellowpipe.com/yis/tools/lynx/lynx\\_viewer.php](http://www.yellowpipe.com/yis/tools/lynx/lynx_viewer.php)
- Use screenreader or voice-enabled tool.
  - [IBM Home Page Reader](http://www-306.ibm.com/able/dwnlds/index.html) [www-306.ibm.com/able/dwnlds/index.html](http://www-306.ibm.com/able/dwnlds/index.html)

## More Ways to Test

- Print with images OFF and black/white to reveal issues like contrast, distractions, print settings.
- Navigate without a mouse (keyboard only).
- Check the load time.

## Test to Accessibility Standards

- Catch the [WAVE](http://wave.webaim.org/index.jsp): <http://wave.webaim.org/index.jsp>
- Don't Be [Hermish](http://www.hermish.com/check_access.cfm) [www.hermish.com/check\\_access.cfm](http://www.hermish.com/check_access.cfm)
- [AIS Web Accessibility Toolbar](http://www.nils.org.au/ais/) [www.nils.org.au/ais/](http://www.nils.org.au/ais/)

## List of [Testing and Repair Tools](http://www.w3c.org/WAI/ER/existingtools.html)

- <http://www.w3c.org/WAI/ER/existingtools.html>

- Some symbols denoting web accessibility:



## ?Questions and Comments!

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