Multimedia and Disabilities

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Red, like the sound of a trumpet
Even small considerations

lead to

significant impacts…
Many faces of disability…

- **Motor impairment**
  - limb loss, shakiness, arthritis, paralysis, and many other difficulties.

- **Visual impairment**
  - blindness, low vision, partially sighted, and color vision deficiencies.

- **Hearing impairment**
  - deaf, hard of hearing, and a variety of imbalances

- **Cognitive impairment**
  - autism, incipient dementia, Alzheimer's disease, and many other difficulties

...
Many faces of disability

- Addiction
- Epilepsy
- Migraine headaches
- Diabetes
- Mental health issues, including depression
- Medications (impact concentration, perception)

Physical, sensory, cognitive or developmental disabilities and various types of chronic diseases
Statistics are astounding

- Unemployment
  - Only 40% of the 9 million aged 18-64 whose disabilities allow them to work

- Life expectancy

- Life enjoyment
Legislation has helped

- United Nations (1976), UK, Costa Rica, USA,…
- The US Rehabilitation Act of 1973
  - All organizations that receive government funding must provide accessibility programs and services
- Federal Americans with Disabilities Act (ADA), and Rehabilitation Act Sections 504 and 508
  - Section 504 – Prohibits discrimination based on disability for federally funded programs
  - Section 508 – Agencies must provide disabled individuals with comparable access to information available to others
    - “Reasonable accommodations”
Still not enough

- Internet has changed the game
- Example: Tweeter
- Education
  - more dependent on on-line instructional material than ever before
- Computer access is essential in many normal functions.
Access to Education

- Requires:
  - Technology
  - Contents

- Must provide disabled individuals with equal access to instructional materials

- Must comply with federal and state accessibility laws

- All solutions benefit those with different learning styles
Normal vision

Photos courtesy of National Eye Institute—National Institutes of Health
Diabetic retinopathy can cause bleeding in the eye
Glaucoma (pressure in the eye) can damage vision over time
Macular degeneration can cause blind spots
Cataracts and near-sightedness cause blurry vision
Color Blindness (Deficiency)

- Affected individuals cannot see certain colors well
- Estimated 5-8% of men cannot see red, green and derivative colors well
- Affects less than 1% of women
Normal and Color Deficient Vision
CSULB Disability Demographics

- Approximately 1,100 (3%) of CSULB students have a disability requiring alternative media or other accommodation.
- About 1 in 5 classes will have a disabled student.
- Other students may have undiagnosed or unreported needs.
Vision impaired

- Persons with vision impairments:
  - Typically use a "screen reader" that basically reads the content on the screen. The user typically uses the keyboard to select headings and hyperlinks.

- Provide specific content pages for blind users that primarily use audio output and keyboard input for communicating with the user. A large font text and large picture narration can be provided for people with low vision.
Cognitive impairment

- People with cognitive impairments might experience problems when accessing Web sites with large amounts of content and complicated navigation models.

- *Provide simplified content pages for people with cognitive impairments.*
Motor impairment

- There exist techniques in modern operating systems for people with motor impairments to slow down the mouse, use speech input, etc. Some operating systems also have support for adjusting the colors of the interface for people with color vision deficiencies.

  *We propose that Web browser plug-ins also support configuring the color adjustment of the multimedia presentation. We also propose that Web site owners provide narration of all audiovisual multimedia for people that are deaf or hard of hearing.*
10 small things that make a BIG DIFFERENCE

10. Avoid Highlighting

“Readers do not read things like highlighting and color changes to text. So when the highlighting is used as a means to show something important, the blind person will miss out on it.”
### Course Schedule

<table>
<thead>
<tr>
<th>Date</th>
<th>Topic</th>
<th>Chapters</th>
<th>Projects</th>
</tr>
</thead>
<tbody>
<tr>
<td>January 21</td>
<td>Introduction to I/O Psychology/History</td>
<td>Chapter 1</td>
<td></td>
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<tr>
<td>January 28</td>
<td>Research Methods</td>
<td>Chapter 2</td>
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</tr>
<tr>
<td>February 4</td>
<td>Performance Criteria/Job Analysis</td>
<td>Chapter 3</td>
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<tr>
<td>February 11</td>
<td>Employee Selection: Predictors</td>
<td>Chapter 4</td>
<td></td>
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<tr>
<td>February 18</td>
<td>Employee Selection: Predictors/Legal issues</td>
<td>Chapters 4 and 5</td>
<td></td>
</tr>
<tr>
<td>February 25</td>
<td><strong>Exam 1</strong> (in class)/ Employee Selection: Utility</td>
<td>Chapter 5</td>
<td></td>
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<tr>
<td>March 3</td>
<td>Training</td>
<td>Chapter 6</td>
<td></td>
</tr>
<tr>
<td>March 17</td>
<td>Training/Performance Appraisal</td>
<td>Chapters 6 and 7</td>
<td>Project 1 Due</td>
</tr>
<tr>
<td>March 24</td>
<td>Performance Appraisal</td>
<td>Chapter 7</td>
<td></td>
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<tr>
<td>March 31</td>
<td><strong>Exam 2</strong>/Organizational Psychology</td>
<td>Chapter 8</td>
<td></td>
</tr>
<tr>
<td>April 7</td>
<td>Organizational Psychology/Teams</td>
<td>Chapters 8 and 9</td>
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<tr>
<td>April 14</td>
<td>Organizational Attitudes and Behavior</td>
<td>Chapter 10</td>
<td>Project 2 Due</td>
</tr>
<tr>
<td>April 21</td>
<td>Organizational Attitudes and Behavior</td>
<td>Chapter 10</td>
<td></td>
</tr>
<tr>
<td>April 28</td>
<td>Work Motivation</td>
<td>Chapter 12</td>
<td></td>
</tr>
<tr>
<td>May 5</td>
<td><strong>Final Exam</strong> (7:30 PM to 10:15 PM)</td>
<td></td>
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</tbody>
</table>

**Note:** Only the highlighted readings will be covered in the Final Exam. Dates are subject to change if necessary. Any revisions to this syllabus will be announced during class time. It is your responsibility to make note of any changes to this syllabus.
9. **Avoid Long Link Text**

“What long website links, if it’s fully written out on a page or something, my computer reads the entire thing. Once it took at least 30 seconds to read the link.”

- A blind student
http://www2.blackboard.com/global/purchase/CourseInfo?PAGE=pgPINSearchResults&COMMAND=MORE_INFO&product=31346758&productType=epackl/?hl=en&shva=1#/hl=en&source=hp&q=webct&aq=f&aqi=g10&oq=&fp=17f9ea1fd87f8bdhl=en&shva=1#/hl=en&source=render?tab=mc&gsessionid=OY-vPP8ztFz3XvP42q7WKw/?tab=cyhp&q=webct&/Overview.aspx
8. Write Meaningful Link Text

“I have a screen reader that reads all of the links on a website page all at once, in a list. So when it comes up to a link like ‘click here’ it doesn’t make too much sense because the links are out of context…” - S.S., student who is blind
MA STATE UNIVERSITY'S WINE BUSINESS INSTITUTE
Zinfandel Advocates & Producers announces the Donn P. Reisen Memorial Scholarships Program at State University's Wine Business Institute, in memory of the... Full Story

OF THE IRANIAN'S WOMEN'S MOVEMENT, DEC. 1
the Iranian's women's movement a landmark event in the evolution of nonviolent onoma State University campus. The... Full Story

ITS FUTURE, DEC. 3
invites the community to weigh in on its future at a Strategic Planning Summit at Recreation Center. The event... Full Story

perage What's ahead in SSU's future through Spring 2010 and beyond? Furloughs increase and savings through consolidations, Green... Full Story

Psychology professor Victor Daniels is retiring this fall after teaching at SSU for over 30 years as Chair of... Full Story

WORLDS OF MOVEMENT
at Sonoma State University in December showing an enthusiastic interest in children's activities at Dance Studio Theatre in the Physical Education... Full Story

Links List


Accessible Technology Initiative 2009
10 small things that make a BIG DIFFERENCE

7. Use High Color Contrast

“ZoomText, the software I use in the AsTech Lab can’t make similar colors stand out enough for my low vision to see. So it really helps when colors are of high contrast.”

- A.W., student with low vision

Accessible Technology Initiative 2009
Product List

Printers

- Laser
  - Model 1: 4 ppm - 2 bin
  - Model 2: 10 ppm - 3 bin

Ink Jet

Scanners

Accessible Technology Initiative 2009
10 small things that make a BIG DIFFERENCE

6. Use Properly Constructed Tables and Graphs

“With tables that don’t have good headings and stuff, I just get confused and the stuff in the table is worthless.”

- M.H., student who is blind
The Material

<table>
<thead>
<tr>
<th>Topic/Category</th>
<th>Parametric</th>
<th>Non-Parametric</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Descriptive Statistics</strong></td>
<td>Mean</td>
<td>Median, Mode</td>
</tr>
<tr>
<td></td>
<td>Standard Deviation</td>
<td>Interquartile Range</td>
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<tr>
<td></td>
<td>Percentiles</td>
<td>Percentiles</td>
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<tr>
<td>Probability Distributions</td>
<td>Normal Distribution (Z)</td>
<td>Binomial Distribution</td>
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<td>Histograms</td>
<td>Distribution</td>
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<td></td>
<td>Continuous Probability</td>
<td>Bar Graphs</td>
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<td></td>
<td></td>
<td>Discrete Probability</td>
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<tr>
<td>Error</td>
<td></td>
<td>Type I ($\alpha$)–Significance</td>
</tr>
<tr>
<td></td>
<td></td>
<td>Type II ($\beta$)–Power</td>
</tr>
<tr>
<td><strong>Inferential Statistics</strong></td>
<td>T-test (Student's t)</td>
<td>Chi-Square($\chi^2$)</td>
</tr>
<tr>
<td></td>
<td>ANOVA (F-test)</td>
<td>Sign Test</td>
</tr>
<tr>
<td>Test of Statistical Difference</td>
<td>Pearson's $R^2$</td>
<td>Spearman's $R^2$</td>
</tr>
<tr>
<td></td>
<td>Regression/Prediction</td>
<td></td>
</tr>
</tbody>
</table>
5. Avoid Poorly Photocopied Pages

“When I try to use Kurzweil with poorly photocopied pages of handouts, it just comes out scrambled, so then I have to have a friend help me hand type it in.” - M.B., student with a learning disability
DIRECTORIO DE LAS GENTES.

La UNION, COPAN.

Jackson, John, marino.

Browell, Andrew, agricultor.

Howell, N.Y., Co. comerciante.

Jackson, J. Sampson.

Gordon, Simon, presbítero.

Garron, Albion, minero.

Jackson, John, de los 87 marineros.

Browell, Andrew, agricultor.

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4. Provide Alternate Text

“Pictures that don’t have alt text just get skipped over by my screen reader, so I miss out on that info.” - S.S., student who is blind
3. Spell Out Acronyms

“It really helps when acronyms are spelled out at least once in the page. Because JAWS pronounces them sometimes in ways that are not clear, it really helps.”

- A blind student
“You may obtain the access code from IT.”
10 small things that make a BIG DIFFERENCE

2. Use Proper Headings

“Before really reading a page, I first scan it to see what topics are in it, just like people who can see scan pages with their eyes. But I use the headings as my guide, gives me a summary if you will of what’s on the page.”

- S.S., student who is blind
1. Heading 1


1.1 Heading 2


1.1.1 Heading 3


Heading 4

10 small things that make a BIG DIFFERENCE

1. Try Using It Yourself

“One of my professors last semester asked to see how my screen reader works. I showed him and he actually sat down to try it himself. After this, he had a new appreciation for making things accessible, that it really does make a difference.”

- S.S., student who is blind

Accessible Technology Initiative 2009
Sample recent projects

- Arizona State University
  - (Dr. Panchanathan) iCare, HCMC

- Wright State University
  - Technology based Learning with Disability

- California State University – Long Beach
  - Accessible Information Technology Initiative

- The ASU-CSULB initiative
Social Interaction Assistance

A Library of Algorithms

Face location
Face detection
Person recognition
Facial expression
Body mannerisms

Camera

Application
Social Interaction Assistance

Camera

A Library of Algorithms

Face location
Face detection
Person recognition
Facial expression
Body mannerisms
The new and improved version:
Learning with Disability

- Wright State: A fully accessible campus
- Interdisciplinary group of over 20
- Research on:
  - The basic nature of human performance
  - The study of human-machine interactions
  - Pedagogy of learning
Brainfingers

- Commercialized by Cyberlink (Dayton, OH)
- Hands free computer access
- Headband with three sets of sensors; detect muscle, eye and brainwave electrical signals; connects to an interface box which connects to computer.
- Software decodes signals from headband and provides computer control.
Touch Interface Technology

- Touch User Interface TUI relies on haptics (as opposed to GUI which relies on sight)
- IC receives signal form inverted switches and interprets them. Conversely, upon receiving a signal activates a switch at the appropriate coordinate.
- Coupling of printed advertising with online advertising
- Applications in eCommerce, gaming, …
Accessible Technology Initiative

- Mandate for accessibility
- CSULB and the entire CSU System
  - Goes beyond ADA and Section 508
- Aggressive plans for:
  - Instructional material
  - All educational and administrative websites
  - Procurement procedures
- Faculty, course and curriculum development
- Research in accessible information technology
Equation Editor

- MathType for Microsoft Word and other editors
- Goal: To create a one step process for preparing accessible course material by using Daisy 3 and MathML.
- Design Science, Inc.: a major contributor to the MathML initiative of the WWW Consortium
- MathPlayer: a browser plug-in that displays MathML and can speak it and/or convert it to Braille.
The Joint ASU-CSULB Project

- Accessible Education
- Mobility Assistance
- Augmentative and Alternative Communication
- Facilitating Activities of Daily Living
- Public policy, Advocacy, and leadership
A Person-Centered Approach

A joint ASU-CSULB project
A truly interdisciplinary approach
Research projects
Curriculum and course
Conclusions:

The Multimedia field holds the key to better access.

Everyone can make an impact.

Even small steps will make significant impact.

Teaming opportunities.