Multimedia and Disabilities

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CSU – Long Beach

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

Normal Vision

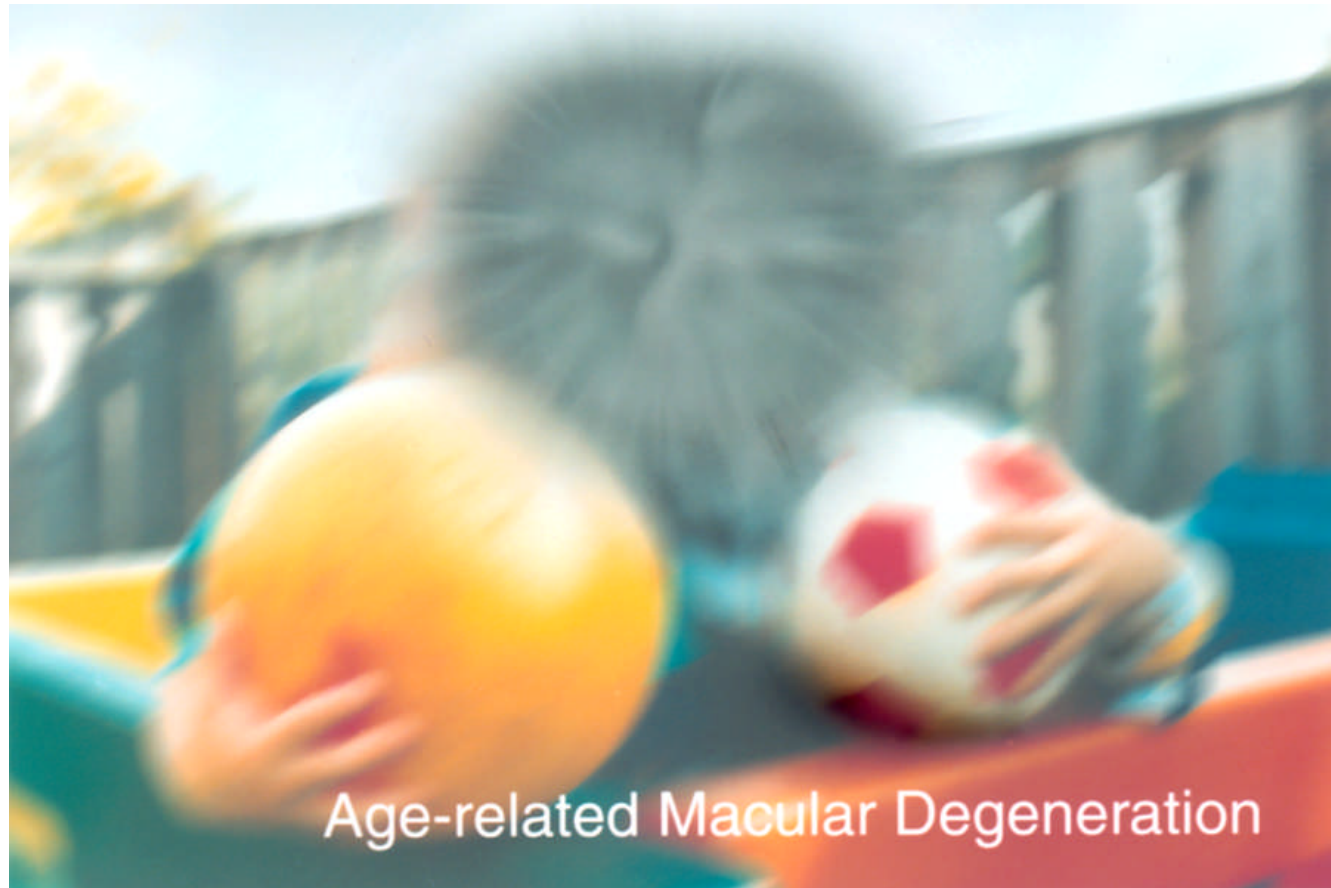**Photos courtesy of National Eye Institute—National Institutes of Health**

Diabetic retinopathy can cause bleeding in the eye

Diabetic Retinopathy

Glaucoma (pressure in the eye) can damage vision over time

Glaucoma
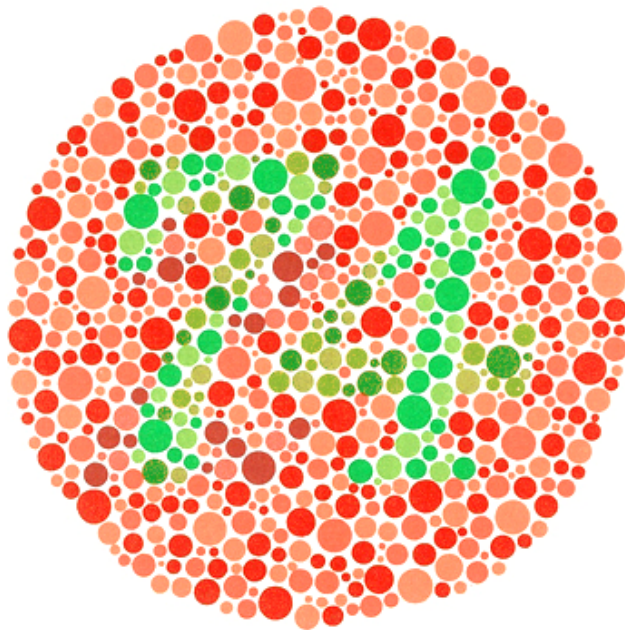
Macular degeneration can cause blind spots

Age-related Macular Degeneration

Cataracts and near-sightedness cause blurry vision

Cataract

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

Illustration of a Ishihara color deficiency test, a series of colored dots surrounding a number, letter or symbol in another color that cannot be read by a color deficient person.

Normal and Color Deficient Vision
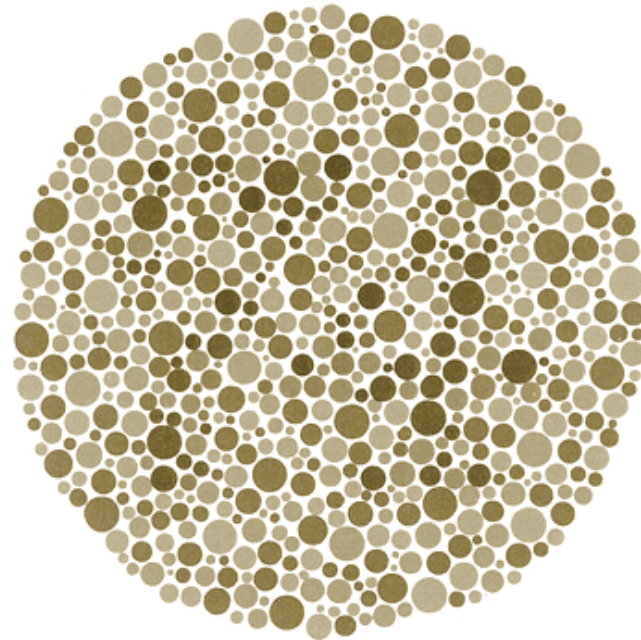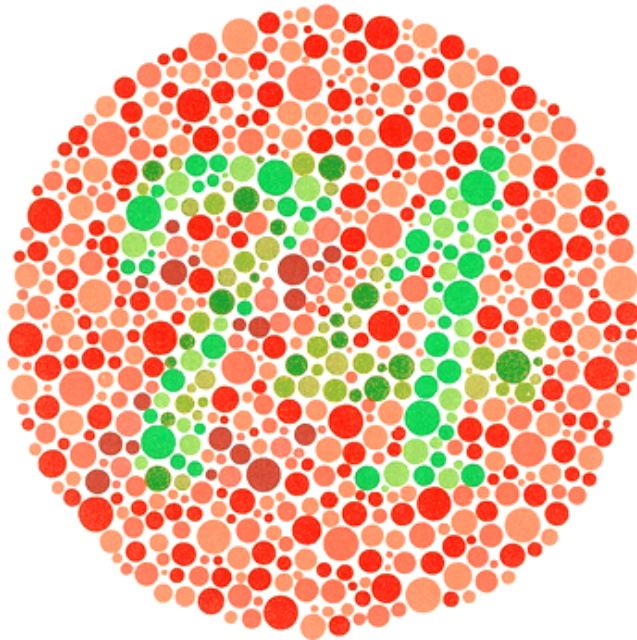
CSULB Disability Demographics

- 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

E

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

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.

10 small things that make a BIG DIFFERENCE

9. Avoid Long Link Text

"With 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

10 small things that make a BIG DIFFERENCE

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 Schola
a State University's Wine Business Institute, in memory of the... <mark>Full Story</mark>

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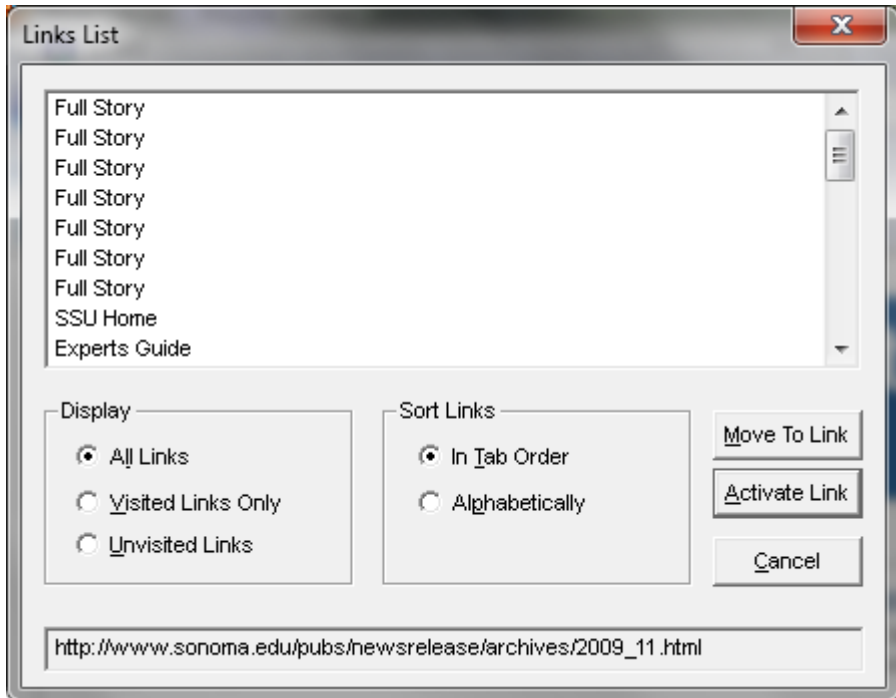onoma State University campus. The... <mark>Full Story</mark>

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

perage What's ahead in SSU's future through Spring 2010 and beyond? Furlough
e increases and savings through consolidations, Green... <mark>Full Story</mark>

ychology professor Victor Daniels is retiring this fall after teaching at SSU for ov
t Chair of... <mark>Full Story</mark>

WORLDS OF MOVEMENT
at Sonoma State University in December showing an enthusiastic interest in ch
Dance Studio Theatre in the Physical Education... <mark>Full Story</mark>

Links List ✕

Full Story
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Experts Guide

Display
- (●) All Links
- (○) Visited Links Only
- (○) Unvisited Links

Sort Links
- (●) In Tab Order
- (○) Alphabetically

[Move To Link]
[Activate Link]
[Cancel]

http://www.sonoma.edu/pubs/newsrelease/archives/2009_11.html

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

Product List

Printers

Laser

Model 1 - 4 ppm - 2 bin

Model 2 - 10 ppm - 2 bin

Ink Jet

Scanners

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

Topic/ Category		Parametric	Non-Parametric
Descriptive Statistics		Mean Standard Deviation Percentiles	Median, Mode Interquartile Range Percentiles
	Probability Distributions	Normal Distribution (Z) Histograms Continuous Probability	Binomial Distribution Bar Graphs Discrete Probability
	Error	Type I (α)–Significance Type II (β)–Power	
Inferential Statistics	Test of Statistical Difference	T-test (Student's t) ANOVA (F-test)	Chi-Square(χ^2) Sign Test
	Test of Statistical Association	Pearson's R^2 Regression/Prediction	Spearman's R^2

Example of Improperly Constructed Table

10 small things that make a BIG DIFFERENCE

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

LA UNION, COPAN.

Alvarado, Bernabé, Juez de Paz y ama-
nuense
Alvarado, Ceferino, agricultor y
Consej. Mpal
Aranda, Teodoro, agricultor r a Coyo-
lito
Barboza, Celso, preceptora
Lopez, Gregorio, Sindico mpal y agri-
cultor r. a. Coyoleto
Lopez, Valentin, Sub Comdte
Matute, Nicolás J. preceptor r. a. Coyo-
lito
Miranda, Simón, agricultor r. a. San
Andres
Moreno, Eugenio, ganadero y Conse-
jero Mpal
Moreno, Juan, Juez de Paz spte y agri-
cultor
Murillo, Santiago, emp. del correo
Ismael A. Srio Mpal y amanuense
Paredes, Samuel, carpintero
fiscal
Rojo, Ponciano, Tesorero mpal y agri-
cultor
Ramirez, José Ma. preceptor r. a. San
Andres
Alonzo R. Alcalde Mpal y agri-
cultor
Rodriguez, Santiago, Regidor mpal y
negociante
Saavedra, Ines, Consej Mpal y agricul-
tor r. a. Coyolito
Saavedra, José Ma. agricultor r. a. Co-
yolito
Rivera, Ignacio, Regidor Mpal y labra-
dor
Ojeda, Belisario, emp. del correo
Luis, preceptor r. a. San Miguel
Villanueva, Pablo J. preceptor y sastre
r. a. San Andres

UTILA, LAS ISLAS.

Baker, B. W. & Co. comerciantes
Banegas, Arturo, guarda y agente fis-
cal
Bodden, Harry, Regidor
Bodden, Victoria, costurera
Bodden, Wilson, carpintero y comer-
ciante
Bush, Lindsey, marino
Bush, William, Jefe de Pol
Cooper, Charles, Alcalde Municip
Cooper, James, agricultor
Cooper, Jan, marino
Cooper, Joseph, Juez de Paz prop
Cruz, Alejo, farolero
Priscilla, lavandera y aplancha-
dora
Diaz, Sarah, lavandera y aplanchadora
Flynn, Rachael, costurera y prop

Greenwood, Eduard, marino
Hinds, John, marino
Howell, Archelaus, agricultor
Howell, N. y Co. comerciante
Jackson, J. panadera
Jackson, John, Juez de Paz S y marino
Morgan, Alfred, marino y agricultor
Morgan, Timoty, marino y agricultor
Pryor, Joseph, preceptor
Reyna, Julio, Comandte Local
Rosse, Richard H. preceptor
Roulet, Edmund, Srio de la Munici-
palidad
Thompson, Carrol, agricultor
Warren, Albert, Sindico
Warren, David, comerciante
Warren, Joseph, tesorero
Williams, Ellen, lavandera y aplancha-
dora
Wood, Herbert, carpintero
Woodville, R. agricultor y comerciante

VADO ANCHO, EL PARAISO.

Castellanos, Anselmo, agente fiscal y
labrador
Castellanos, Calixto, Sindico mcpal y
agricultor
Castellanos, Cresencio, ganadero
Colindres, Regidor 1.° y agri-
cultor
Garcia, Antonia, hacendada
Garcia, Nieves, Subcomdte carpintero
Hernandez, Miguel, Regidor 1.° y la-
brador
Hernandez, Timoteo, preceptor y la-
brador
Lopez, Gregorio A. Srio Mcpal y labra-
dor
Lopez, Jorge, carpintero
Lopez, Melecio, Juez de Paz Supl y la-
brador
Lopez, Victor, Regidor 1.° y labrador
Martinez, Natividad, preceptor y sastre
Mejia, Josefa, preceptora y costurera
Mejia, Leoncio, cantor
Ochoa, Ambrosio, Alcalde Mcpal y la-
brador
Ramirez, Santiago, carpintero
Rodriguez, Fernando, preceptor y la-
brador
Sanchez, Ramona, hacendada
Santos, Mónico, carpintero
Vasquez, Sebastian, Juez de Paz y la-
brador

VALLADOLID, GRACIAS.

Alberto, Nicolas, Juez de Paz spte
Ayala, Sebastian, Regidor mcpal y agri-
cultor
Carbajal, Justiniano, Srio Mpal y ama-
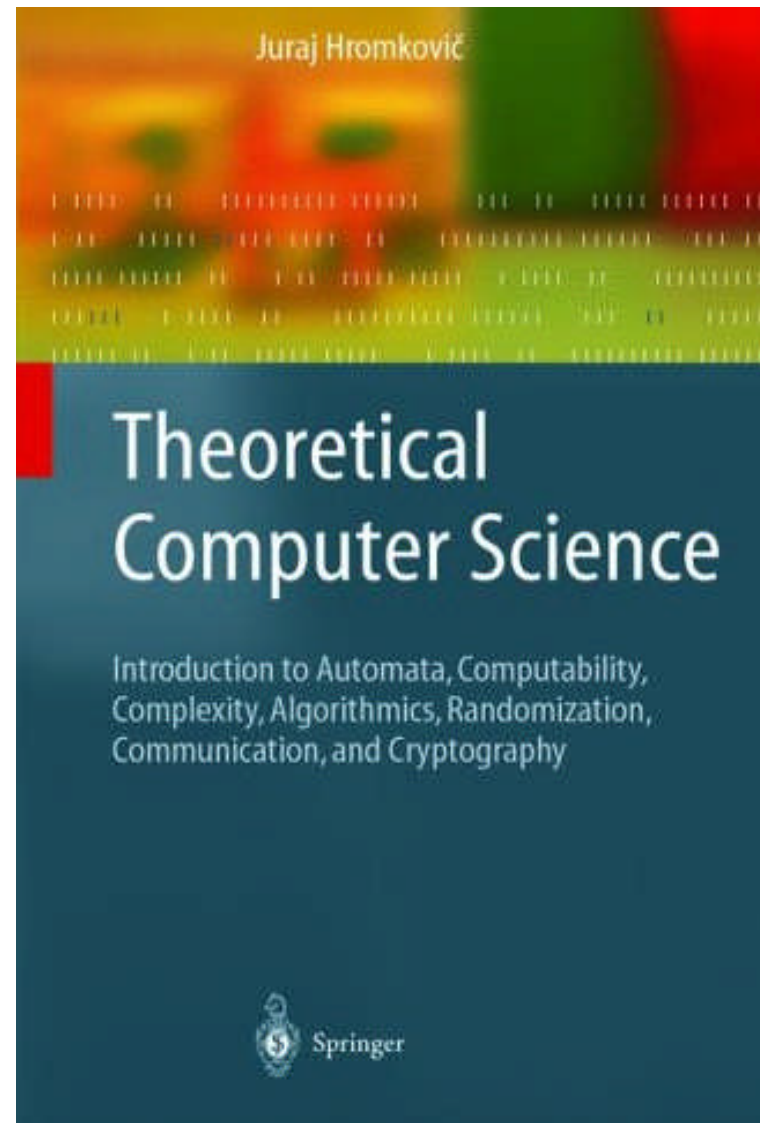nuense
Cerna, Gregorio, Juez de Paz prop

10 small things that make a
BIG DIFFERENCE

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

10 small things that make a
BIG DIFFERENCE

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

Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text.

1.1 Heading 2

Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text.

1.1.1 Heading 3

Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text.

Heading 4

Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text. Body Text.

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

Sample recent projects

- Arizona State University
  - (Dr. Panchanathan) *i*Care, 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
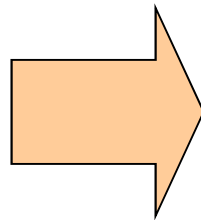
Camera

A Library of Algorithms
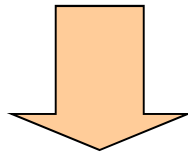
Application

Face location

Face detection

Person recognition

Facial expression

Body mannerisms

Social Interaction Assistance

Camera

A Library of Algorithms

Face location

Face detection

Person recognition

Facial expression
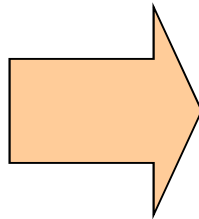
Body mannerisms
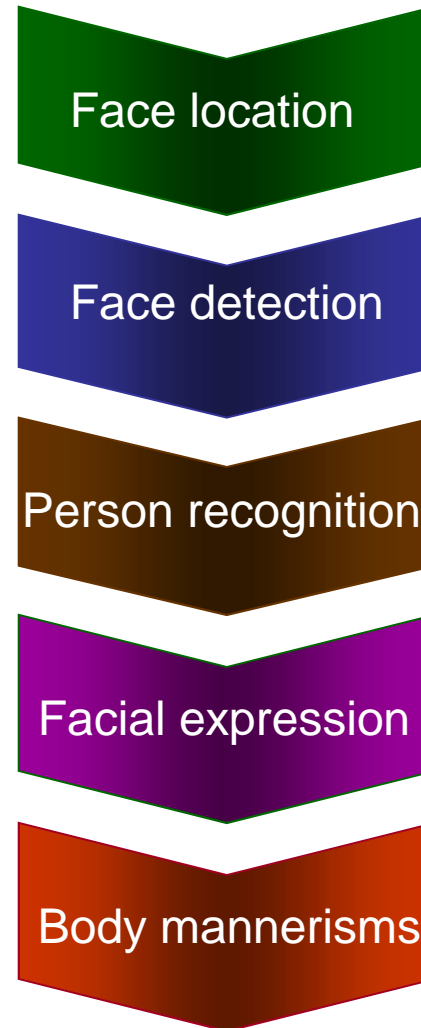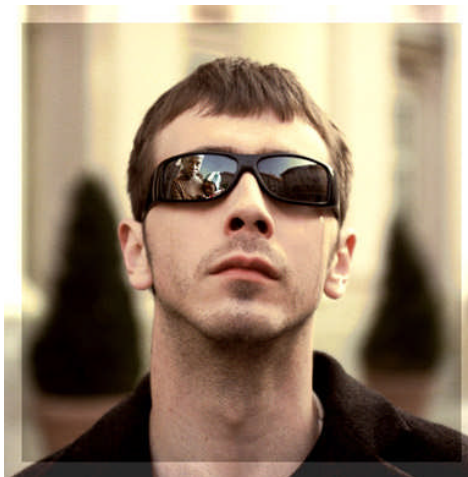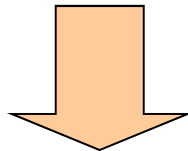
The new and improved version:

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

Calyceal synapses (red) in central auditory pathway
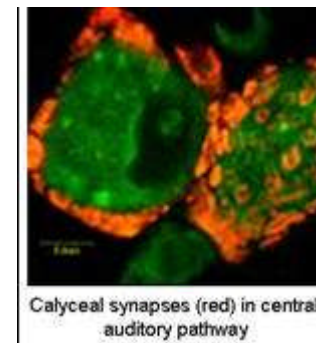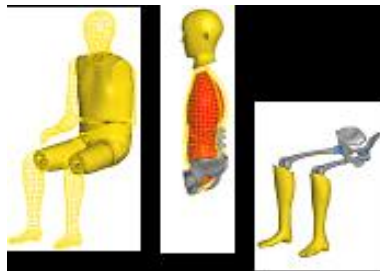
Brainfingers

- 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, …
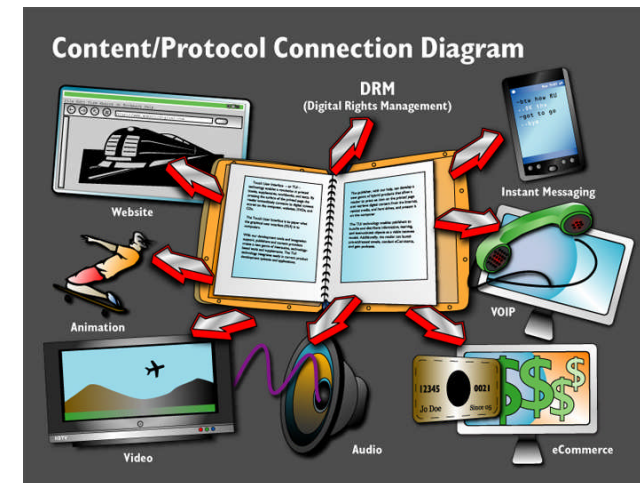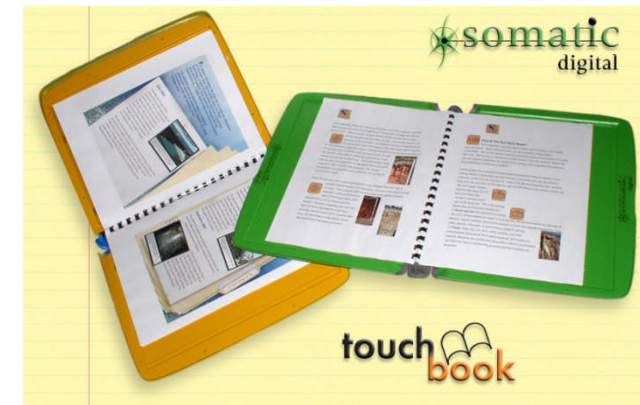
Accessible Technology Initiative

- **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.
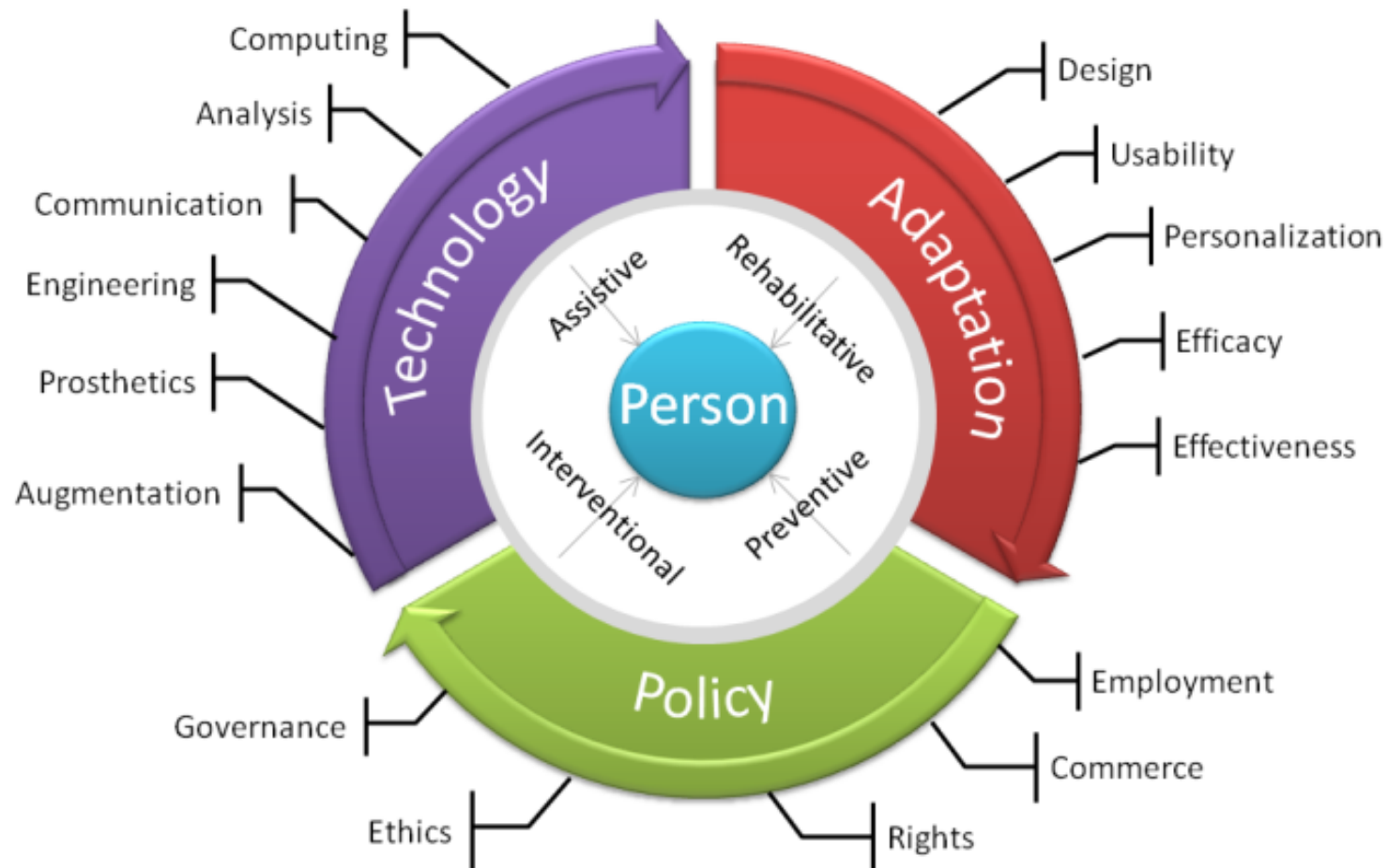
The Joint ASU-CSULB Project
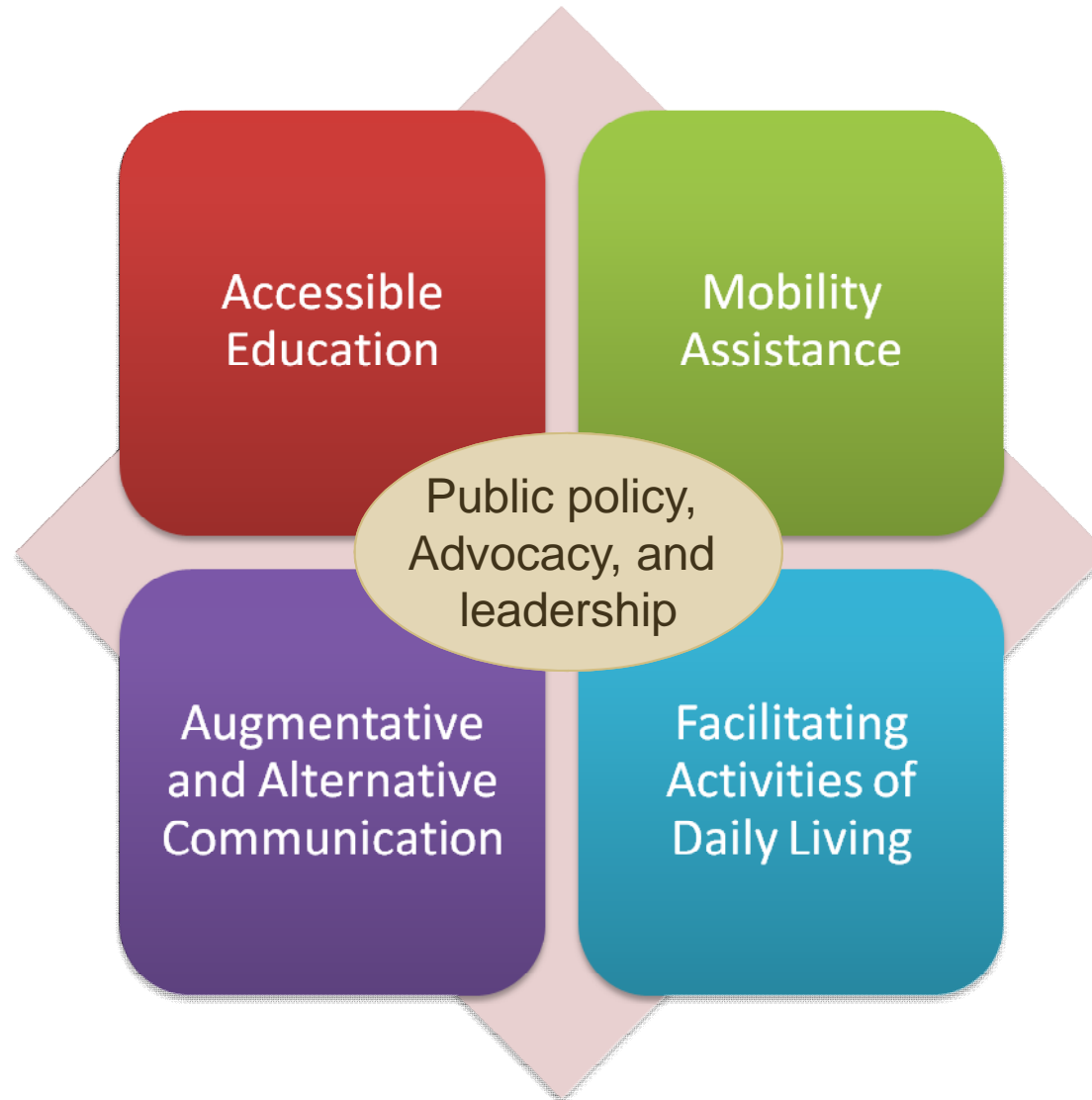
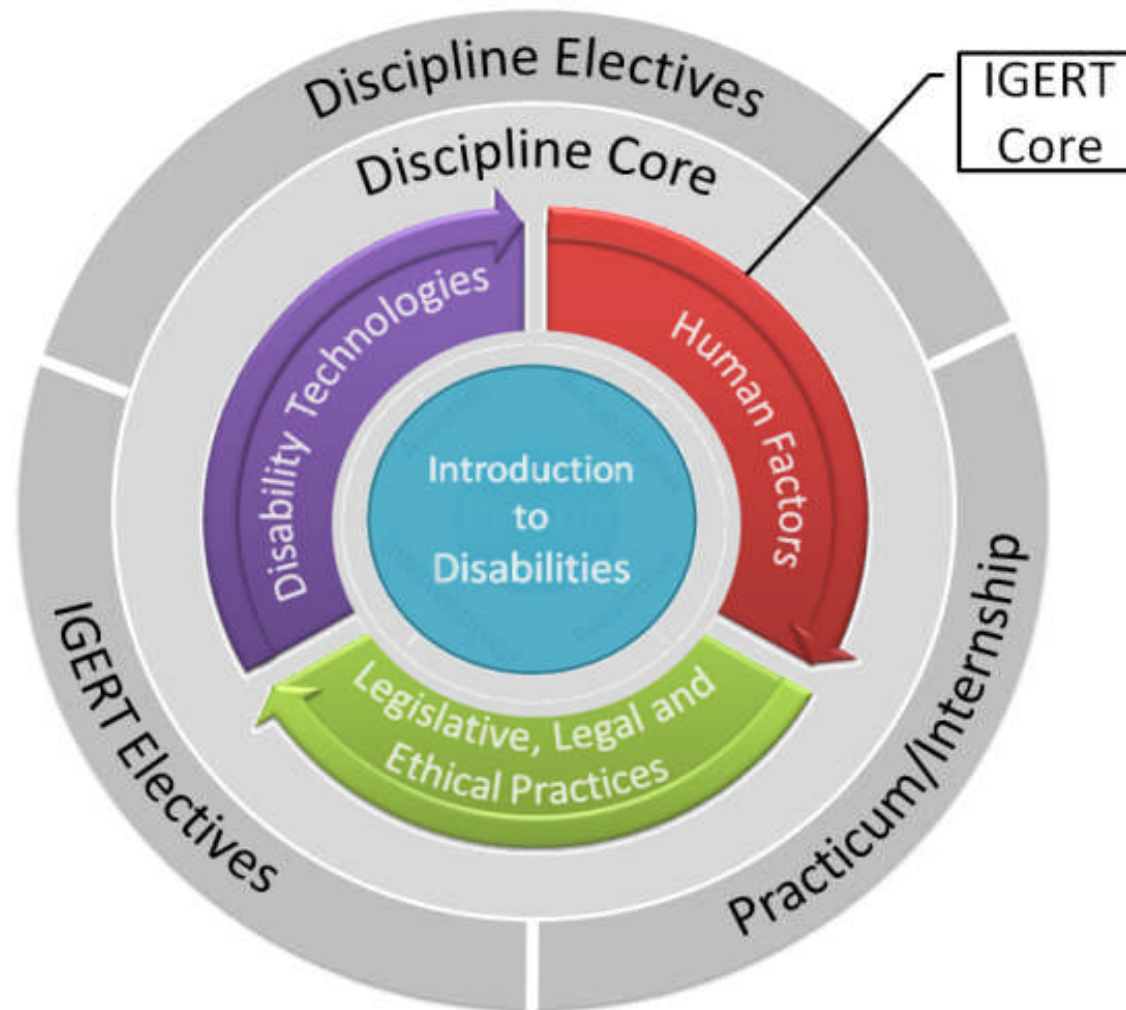# A Person-Centered Approach

A joint ASU-CSULB project
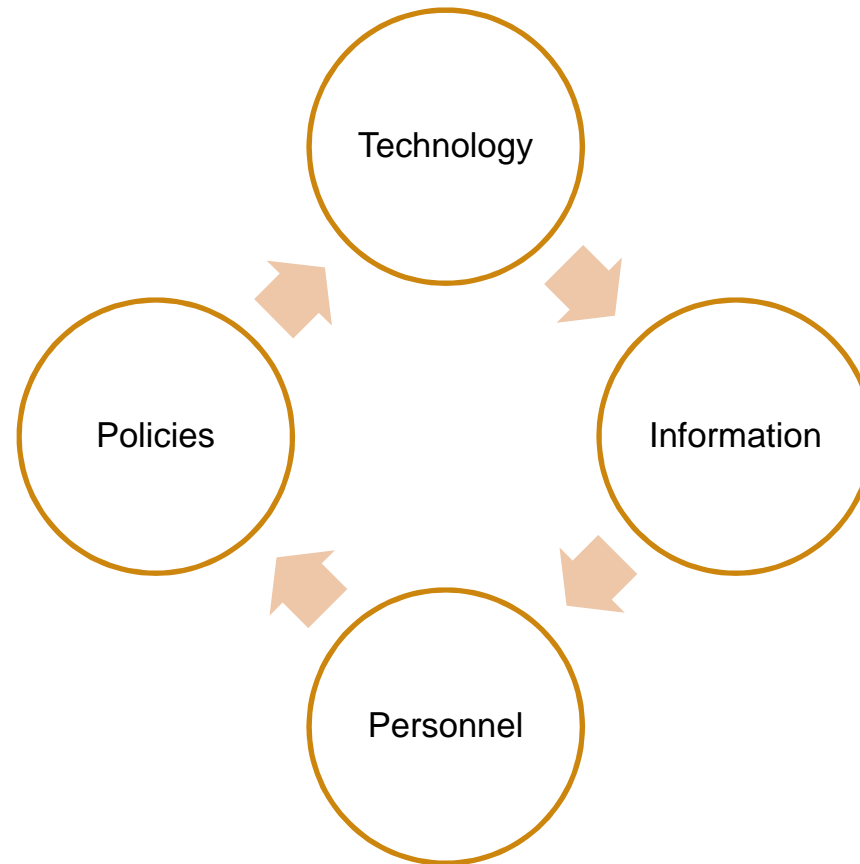
A truly interdisciplinary approach

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.