Accessibility
CSEP 590

Autumn 2008

Instructors

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Course Goals

- Introduction to accessibility technology and research
- Introduction to issues, policy, and laws related to accessibility
- Introduction to persons with disabilities (the users)

Student Engagement

- Reading
  - Each unit will have a reading assignment
- In-class and on-line discussion on lecture topics
- Project
  - One page project proposal with references due October 20th
  - 10 page project report on November 24th
  - 10 minute presentation on November 24th
  - Reading and commenting on others projects until December 5th.

CSE 590 W

- Students in CSE 590 W, Computers and Disabilities, will be attending our class and will participate in the discussion and reading project reports.
- Added expertise will help with discussion.

Grading

- Quality of participation in discussion, both in-class and on-line.
- Quality of the project
  - Depth of analysis
  - Organization
  - Writing

Guest Speakers

- Annuska Perkins, Microsoft
- Cynthia Shelly, Microsoft
- Krzysztof Gajos, Microsoft Research
- Kate Deibel, CSE
- Kurt Johnson, Dept. of Rehabiliation Medicine
- Matthai Philipose, Intel Research
- Susumu Harada, CSE
- Anna Cavender, CSE
- Jeff Bigham, CSE
- Julie Kientz, Techical Communication and Information School
- Jake Wobbrock, Information School
- Shaun Kane, Information School

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Topics

- Disabilities
- Current solutions
- Research
- Policy and law
- Technology acceptance

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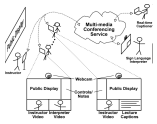
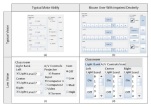
Research Examples



ClassInFocus

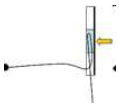
VoiceDraw

WebAnywhere



Supple

Abaris



Barrier Pointing

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Introductions

- Name
- PMP student or not
- If PMP, workplace
- If not, research area

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Introduction to Accessibility

Richard Ladner

Reading

- Assistive and Mainstream Technologies for People with Disabilities. Chapter 7 from *The Future of Disability*. Institute of Medicine of the National Academies. 2007
- E.P. Glinert, B. W. York. Computers and People with Disabilities.*Communications of the ACM*, Vol. 35, No. 5. 32-34, 1992.
- R.E. Ladner. Access and Empowerment. Commentary on "Computers and People with Disabilities". *Transaction on Accessible Computing*, to appear.
- A. Cavender, S. Trewin, V. Hanson. General Writing Guidelines for Technology and People with Disabilities.
- R.E. Ladner. National Federation of the Blind speech.

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National Federation of the Blind Speech Themes

- My background
- Importance of diversity
- Access technology
- Empowerment

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Outline

- Persons with disabilities
- Access technology
- Access technology research

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World Health Organization

- International Classification of Functioning, Disability and Health (ICF), 2001
  - Health: umbrella term for disease, disorder, injury, or trauma.
  - Functioning: umbrella term for body functions and structures, activities, and participation.
  - Disability: umbrella term for impairments, activity limitations, and participation restrictions.

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Basic Data

- 16% of US population to ages 15 to 64 is disabled.
- 10% of the workforce is disabled
- 5% of the STEM workforce is disabled
- 1% of PhDs in STEM are disabled

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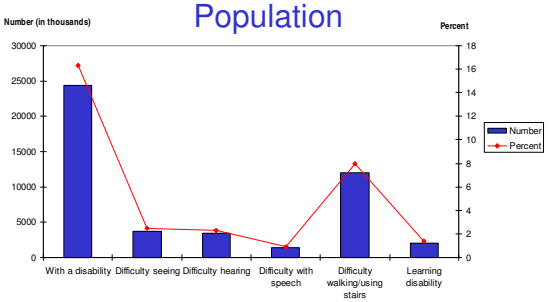
Demographics General Population



Source: U.S. Census Bureau, Survey of Income and Program Participation, 2002

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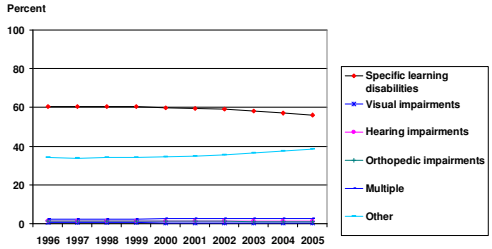
Demographics Ages 14-21



SOURCE: U.S. Department of Education, Office of Special Education Programs, www.ideadata.org

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Categories of Disability

- Vision
- Hearing/Speech
- Mobility/Motor/Dexterity
- Cognitive

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Conditions that Cause Mobility/Motor/Dexterity Disabilities

- Cerebral Palsy
- Muscular Dystrophy
- Spinal Cord Injury
- Missing limbs

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Conditions that Cause Cognitive Disabilities

- Dyslexia
- Attention Deficit/Hyperactivity Disorder (ADHD)
- Autism
- Asberger's Syndrome
- Downs Syndrome

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Onset of Disability

- Born with a disability
- Caused by illness of accident
- Coincident with aging

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Example: Onset of Deafness

- Born deaf
  - There are genetic causes of deafness
- Deaf before speech (prelingual)
  - Spinal meningitis still causes deafness in babies
- Deaf after learning to speak and hear (postlingual)
- Deaf late in life
  - Most common

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Degree of Disability

- Mild
  - Possibly correctable
- Moderate
  - Inconvenient
  - Possibly partially correctable
- Profound
  - A serious impediment in everyday life
  - Possibly partially correctable

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Example: Degree of Vision Disability

- Correctable with glasses or contacts.
- Cataracts
- Color blindness
- Retinitis Pigmentosa (tunnel vision)
- Macular Degeneration
- Fully blind

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Stability of Condition

- Stable
  - Cerebral Palsy
  - Genetic forms of deafness
- Degenerative
  - Retinitis Pigmentosa
  - Macular Degeneration
  - Muscular Dystrophy
  - Usher's Syndrome
  - Many age related disabilities

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Multiple Disabilities

- Deaf-blindness
  - Usher's Syndrome
- Attention Deficit/Hyperactivity Disorder (ADHD) and Dyslexia
- Deaf with Cerebral Palsy (CP)
- Deaf with Asbergers Syndrome

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Models of Disability

- Medical Model
  - Disabled people are patients who need treatment and/or cure.
- Rehabilitation Model
  - Disabled people need assistive technology or human assistance for employment and everyday life.
- Legal Model
  - Disabled people are citizens who have rights and responsibilities like other citizens. Accessibility to voting, television, and telephone are some of those rights.
- Social Model
  - Disabled people are part of the diversity of life, not necessarily in need of treatment and cure. They do need access when possible and have legal rights.

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Examples

- A deaf couple rejoices at learning their newborn is also deaf.
- Citing the Americans with Disabilities Act (ADA) blind man sues Target because its web page is not accessible using a screen reader, and wins.

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Terminology

- Impairment
  - Characterizes physical, mental, physiological loss or injury.
- Disability
  - Refers to a functional limitation.
- Handicap
  - Barrier or problem caused by society or environment.

American Psychological Association

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Terms to Avoid

- Terms that identify people with their disability
  - "the deaf", "the blind", "the disabled"
- Trendy Euphemisms
  - "physically challenged", "special", "differently-abled"
- Derogatory terms
  - "deaf and dumb", "retarded", "handicapped", "deviant"

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The Trouble with "Impaired"

- Hearing Impaired, Vision Impaired, Mobility Impaired are in common use.
- Many feel that the word "impaired" accentuates the negative.
- "Impaired" has its roots in the medical, education, and rehabilitation fields and not from the disabled people themselves.

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"Disability"

- "Person with disability"
  - Put the person first, rather than the disability
  - Politically correct in US
- "Disabled person"
  - Putting the adjective before the noun does not normally emphasize the adjective in English. It describes the noun.
  - Politically correct in UK

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Examples of Terminology

- National Association of the Deaf
  - "The mission of the NAD is to preserve, protect and promote the civil, human and linguistic rights of deaf and hard of hearing individuals in the United States of America."
- National Federation of the Blind
  - "The NFB is a consumer organization of blind people working together to improve opportunities for the blind and the understanding of blindness by the general public."

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Outline

- Persons with disabilities
- Access technology
- Access technology research

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Technology

- Prosthesis
  - Augmentation to restore lost function. Call it a "cure."
- Assistive technology
  - Popular in rehabilitation literature. Emphasis on the need for assistance.
- Access technology
  - Allows an activity that would be difficult to impossible to achieve without it. Emphasis not on restoring function, but on achieving an end goal by whatever means possible.
  - Examples: Screen readers, video phones, wheel chairs

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Access Technology Approaches

- Technology to augment an individuals' abilities.
  - Hearing aid
  - Voice input device
  - Screen reader
  - Cane
- Change the environment to compensate for individuals' abilities
  - Curb cuts
  - Closed captions
  - Braille lettering in public places
  - Adherence to web accessibility guidelines

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Access Technology Approaches

- Direct – benefits the person directly
  - Most access technology
- Indirect – benefits the person in an indirect way
  - Braille translation software
  - Caregiver products

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Mainstream Technology

- The purpose of much of technology is to make all our lives a bit easier
- A mainstream technology may provide accessibility by its very nature.
  - Instant messaging
  - Video phone
  - Golf carts

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Universal Design

- Design of environments, products and services to be used with people with a wide range of abilities.

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Influence of Access Technology

- Technology invented for accessibility may become mainstream
  - Telephone
  - Optical Character Recognition
  - Speech Synthesis
  - Speech Recognition
  - Synchronous texting
  - Mobile GPS

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Alternative Computer Input Devices

Thanks to Dan Comden, Director of the UW Access Technology Lab

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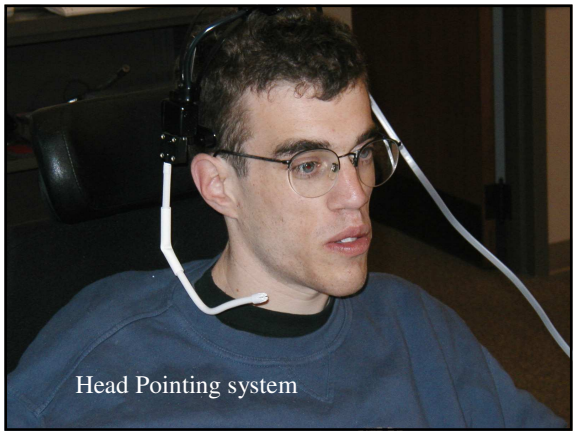

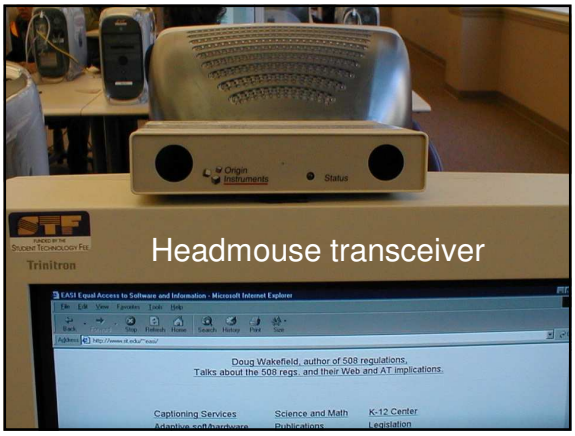

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Rollermouse + large keys

Joystick Mouse

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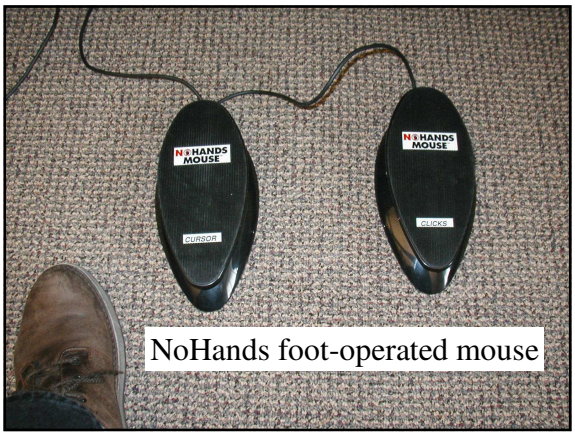
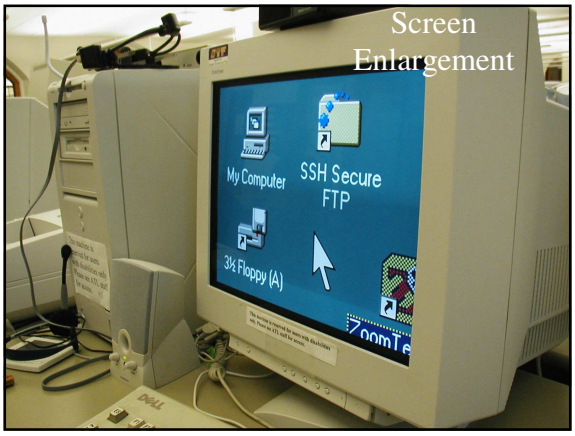


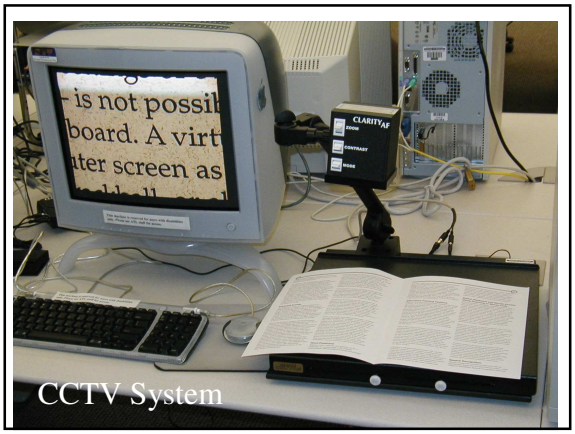
NoHands foot-operated mouse

Alternative Computer Output Devices

Thanks to Dan Comden, Director of the UW Access Technology Lab



Screen Enlargement



CCTV System

Technology for Deaf People

Hearing Technology

- Hearing Aids
- FM Systems
- Cochlear Implants

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Latest Hearing Aid

- Lyric

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FM Systems

- Personal
- Public (Opera House, …)

Personal FM System

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Cochlear Implant

"Normal" ear

Implanted ear

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Texting

- TTY
- TTY Relay Service
- E-mail
- Instant Messaging
- Captions

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TTY

TTY circa 1970

Modern TTY with
built-in acoustic modem

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TTY Relay

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E-Mail / Instant Messaging

Sidekick

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Closed Captions

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Closed vs. Open Captions

- Closed Captions
  - Optional
- Open Captions
  - Always on the screen
  - Like subtitles for foreign language films
- Leader - WGBH Media Access Group

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Video

- Video Phone
- Video Relay Service (VRS)
- Video Remote Interpreting (VRI)
- MobileASL (UW Project)

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Picturephone

"Picturephone" demonstrated by AT&T at the 1964 World's Fair

- Required too much bandwidth for phone system
- Deaf world excited then disappointed

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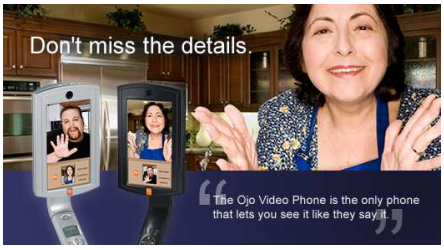
Video Phone



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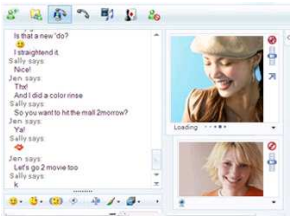
Ubiquitous Video Phones

Skype



Windows Live Instant Messenger

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Video Relay Service (VRS)

© Sorenson

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Video Remote Interpreting (VRI)

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Outline

- Persons with disabilities
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- Access technology research

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Access Technology Research

- Industry
  - Hundred of small companies
  - Google, Microsoft, IBM have some major efforts
- Universities
  - UW is a leading school
  - SUNY Stony Brook, University of Maryland, Baltimore County, Colorado, Wisconsin
  - Japan, UK, and many other countries have major universities and government programs.
- Centers
  - Trace Center, Smith-Kettlewell

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Accessibility Conferences

- International ACM SIGACCESS Conference on Computers and Accessibility (ASSETS)
- Conference on Technology & Persons with Disabilities Conference (CSUN)
- Assistive Technology Industry Association (ATIA) Conference
- Closing the Gap Conference
- Accessing Higher Ground: Accessible Media, Web and Technology Conference.
- International Conference on Computers Helping People with Special Needs (ICCHP)
- International Cross-Disciplinary Conference on Web Accessibility (W4A)

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Mainstream Conferences

- More and more accessibility research appears at mainstream conferences
  - ACM CHI
  - IUI – Intelligent User Interfaces
  - DIS – Designing Interactive Systems

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CHI "Disability" Search

Year	Number
1982 – 85	0
1986 – 90	10
1990 – 95	15
1996 – 00	20
2001 – 05	90
2006 – 07	50 (2 years)

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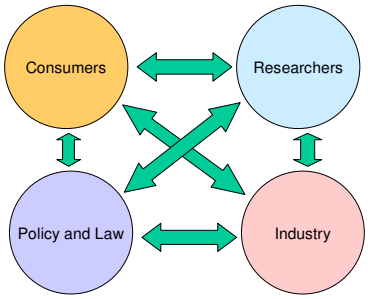
Overview of Accessibility



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