SAMPLE INTRO TO ACCESSIBILITY SLIDES

Source: Presentation by Andy Ko, Associate Professor, iSchool, UW

Accessibility

Andrew J. Ko
Associate Professor, The Information School

People have all kinds of ability

If you design without accounting for variation in ability, your design will fail

Designs that account for all abilities are called **accessible designs**

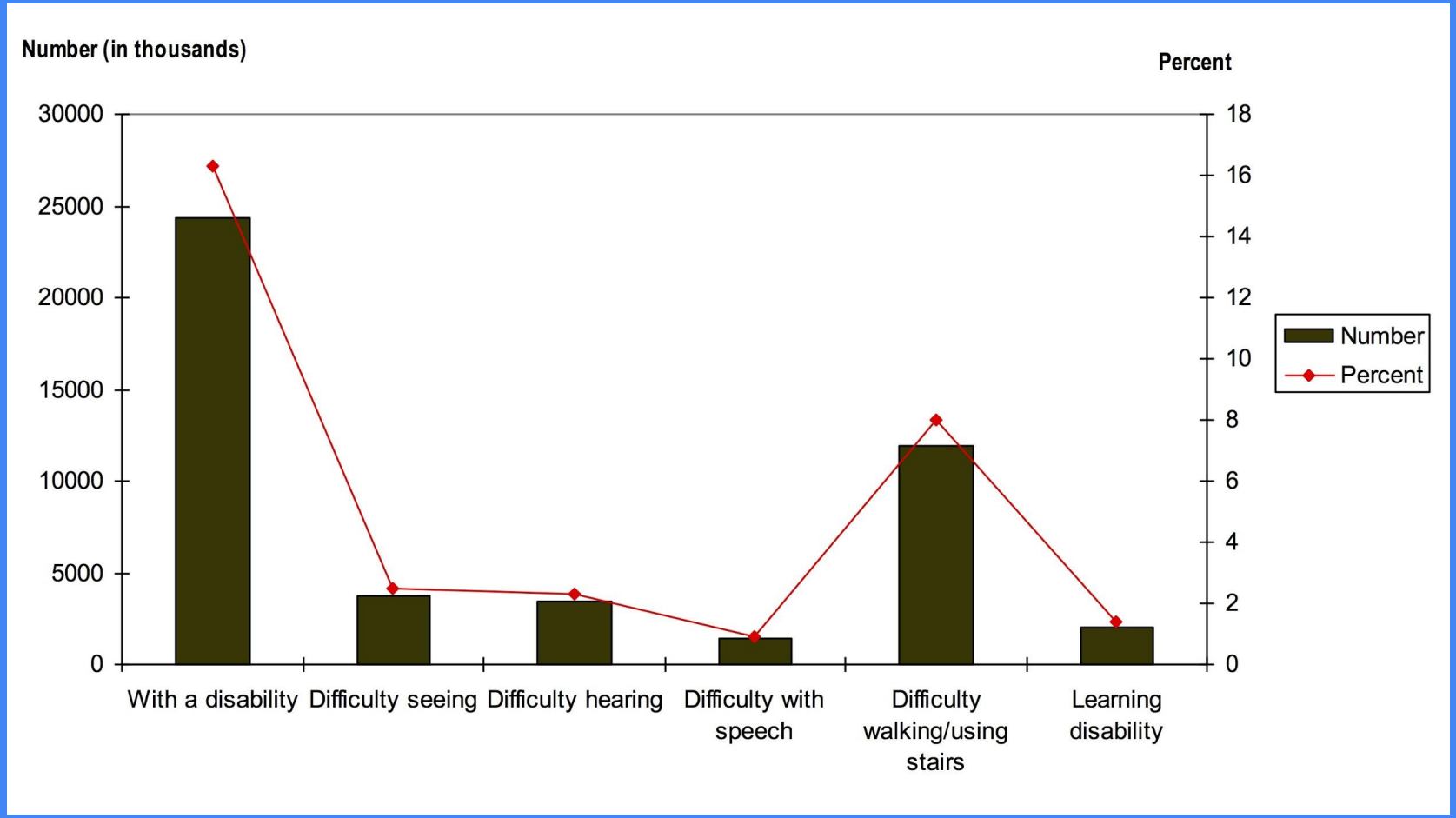
Outline

- What kinds of abilities are there?
- How do we think about ability?
- Access technologies
- Designing for accessibility

(Some) kinds of disabilities

- Vision
  - Blind
  - Low-Vision
  - Color Blind
- Hearing
  - Deaf
  - Hard of Hearing
- Speech
  - Ability to speak
  - Speed impediments
- Mobility
  - Ability to walk
  - Ability to use limbs
- Cognitive
  - Dyslexia, dysgraphia, dyscalculia
  - ADHD
  - Memory loss
  - Learning disabilities
- Behavioral
  - Bipolar

1 in 7 people worldwide have some form of disability



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

>15% of K-12 students have a disability

According to reports of IEP and Section 504 accommodations from U.S. public schools.

Disabilities in U.S. schools

According to U.S. national individualized education plan data from the National Center for Education Statistics.

Learning	2,400,000
Speech	1,400,000
Health	700,000
Autism	400,000
Developmental	400,000
Emotional	400,000
Hearing	80,000
Mobility	60,000
Vision	30,000

Discuss with your neighbor: do you know someone who has a disability?

How should we think about all of these abilities?

The Medical Lens

Disabled people are “patients” who need treatments or cures.

E.g., medication

The Education Lens

Disabled youth need to be educated differently because of their different abilities.

E.g. schools for the deaf, special education

The Rehabilitation Lens

Disabled people need assistive technologies and training to be able to secure employment and care for themselves.

E.g., hearing aid, prosthesis

The Legal Lens

Disabled people have rights and responsibilities, such as access to public buildings, voting, education, etc.

E.g., curb cuts

The Sociocultural Lens

Variation in ability is natural. Disability is caused by how society is designed, not by nature.

E.g., video captioning

With your neighbor: one of you take the legal lens and the other take sociocultural lens. Debate how UW should serve deaf students.

Widespread information access technologies

Telephones (1880)

Invented by A.G. Bell

“devising methods of exhibiting the vibrations of sound optically, for use in teaching the deaf and dumb.” (Fay, American Annals of the Deaf, 1887)

Texting (1960’s)

Began as TTY for transmitting text over phone lines, evolved into SMS on cell phone lines.

Modems (1960’s)

Robert H. Weitbrecht (deaf), invented modem to optimize TTY communication. Modems became the gateway to internet access in the 1980’s and 1990’s.

Machine vision (1974)

Motivated by Optical Character Recognition (OCR), which helped convert printed materials into machine readable text.

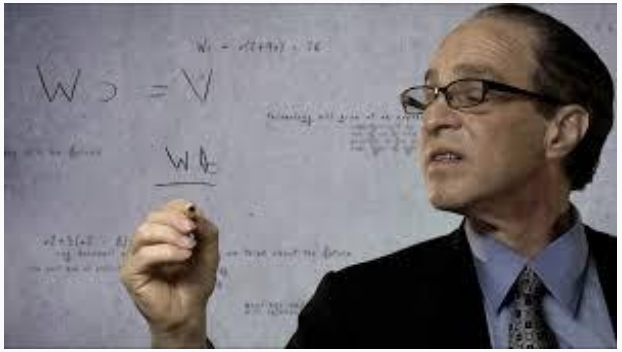
Schantz, Herbert F. (1982). The history of OCR, optical character recognition. [Manchester Center, Vt.]: Recognition Technologies Users Association.

Speech synthesis (1976)

Motivated by need for people without sight to read text.

Speech recognition

Motivated by need for people without sight to enter text without hands.



Captioning (1972)

First enabled deaf viewers to read audio.

Screen readers (1980)

Allow non-visual access to computers.
Motivated by Section 508 accessible technology requirements.

Discuss with your neighbor: why are access technologies useful to people without disabilities?

Situational impairments

Even able-bodied people can be temporarily disabled (broken arm, injured eye, carrying a bag of groceries)

Information access technologies allow us to get information in whatever way is convenient for a situation.

Designing for access

ASSETS

A whole research conference dedicated to research on access technologies.

Universal design

Don’t design for an **average** user

Design for a **distribution** of users

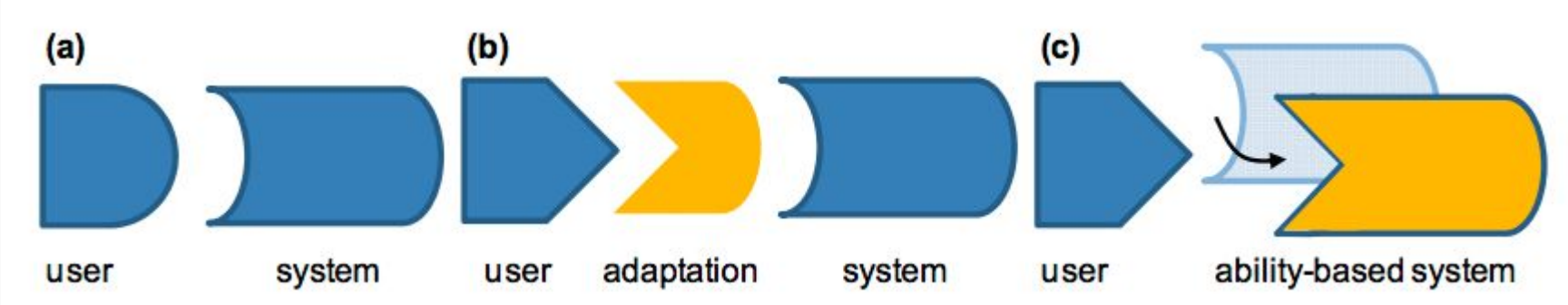
Cockpits (1952)

U.S. Air Force redesigned seats to fit the average pilot. Fit nobody, training results dropped.

Redesigned seat to be configurable for any pilot; training results rose above previous levels.

Ability-based design

Adapt systems to individuals, rather than building universal adaptations.



Adaptive keyboards

Automatically generate a layout that works for a specific individual.

Findlater, L. and Wobbrock, J.O. (2012). Personalized input: Improving ten-finger touchscreen typing through automatic adaptation. Proceedings of the ACM Conference on Human Factors in Computing Systems (CHI '12). Austin, Texas (May 5-10, 2012). New York: ACM Press, pp. 815-824

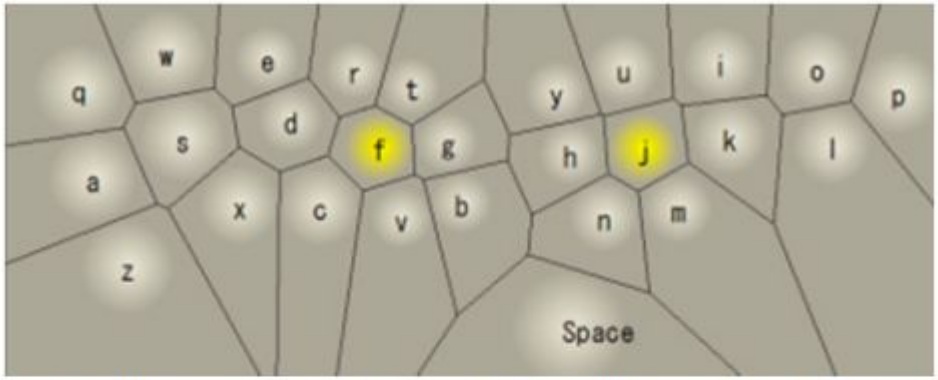


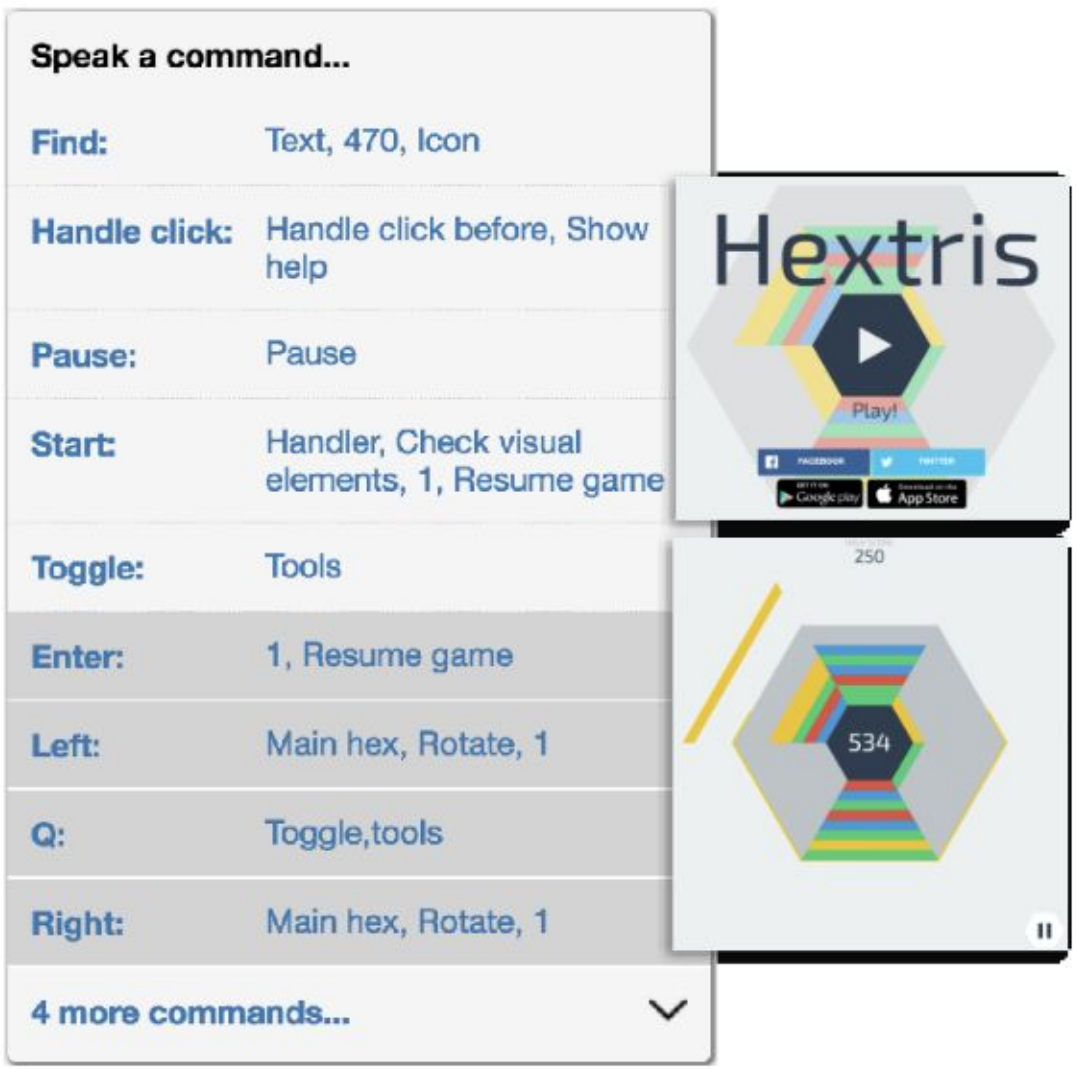
Figure 2. Visual adaptation of CATKey, showing Voronoi tessellation around adapted key centers (from [7]; copyright Springer).

Figure 3. Adapting keyboard halves to hands in our system.

Transform user interfaces

Automatically reverse engineer commands to create alternative accessible interfaces.

Amanda Swearngin, Andrew J. Ko, and James Fogarty (2017). Genie: Input Retargeting on the Web through Command Reverse Engineering ACM Conference on Human Factors in Computing Systems (CHI), to appear.



If universal design improves results for everyone, why don’t more companies do it?

They can’t do it without your help.

- **Microsoft** hired a Chief Accessibility Officer
- **Adobe** built an accessibility training team
- **Facebook** has an Accessibility team
- Can’t hire enough designers and engineers who understand accessibility

TeachAccess

Founded by industry to advocate for more teaching about accessibility in colleges and universities.

That’s why you’re reading these words.

Recap

Disability is more prevalent than you think

Ability is partly determined by design

Access technologies can enhance ability

Universal design is reaching industry

Questions?

3 minute break

Activity: experience screen readers

Grab your smartphone

We’re going to enable the screen readers on your phone.

Enable your screen reader

iOS: Settings > General > Accessibility > VoiceOver > Hit the switch

Android: Settings > Accessibility > Talkback > Hit the switch

Familiarize yourself.

Input works differently now. For example, tap now reads the screen and double-tap selects. Use two or three fingers to scroll by page. Play with it for a minute.

Close your eyes.

Go to a social media account and read your feed.

How was the experience of reading different?

Keep your eyes closed.

Write an email to your friend/parents saying hello!

What was text entry like?

Download the latest free game from an app store.

Try playing it.

Was it possible to play the game?

About 8 million blind Americans rely on screen readers to access information.

Discuss with your neighbor: what obligation should Apple and Google have to serve these 8 million blind Americans?

Questions?