Learning from Accessibility Research:
An issue of increasing importance to older users

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Topics for this session

- Two studies – users who listen to the screen, users who magnify the screen
  - navigation
  - content
  - forms
  - other issues
- Issues for the future: How do we achieve experience equity and universal access?
The two studies

- Users who listen
  - 16 users
  - working with JAWS or Window-Eyes
  - 2 hours each, typical usability testing scenarios, different U. S. federal web sites

- Users who magnify the screen
  - 10 users
  - working with ZoomText
  - 2 hours, same methodology

Goals of our studies

- Understand the relationship between accessibility and usability
- Understand how users work with web sites – users who listen and users who magnify
- Develop research-based guidelines for accessibility and usability
- Assess the usability of specific web sites
What did we learn? –
Navigation for users who listen

Users who listen:
- scan with their ears
- want to skip the navigation
- are keyboard-oriented

- often listen only to links
- sometimes jump from heading to heading
- occasionally use CTRL-F – Find
- rarely use the Virtual Viewer

Scanning with their ears
- Impatient – just like other users
- Want to find what they need quickly
Skipping the navigation

- All wanted to skip the navigation
- Only half – the highly sophisticated half – knew what "skip navigation" means

- skip navigation
- skip to content
  (JAWS misreads content)
- skip to main content

Listening only to links

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Listening only to links

- Benefits:
  - Can be very quick way to access information – if the
    - number of links is not overwhelming
    - link names are meaningful

- Issues:
  - Do not hear the non-linked surrounding text
  - Do not hear the bullets under a link

- Recommendations:
  - Link labels must be meaningful and carry all
    the information
  - Tricky to obtain the most meaning with best length

Jumping from heading to heading

Reactions after Smallpox Vaccination

The smallpox vaccine prevents smallpox. For most people, it is
reactions to the vaccine, which indicate that it is beginning to
attention.

- Normal, Typically Mild Reactions
  These reactions usually go away without treatment:
  - The arm receiving the vaccination may be sore and red where
  - The glands in the armpits may become large and sore.
  - The vaccinated person may run a low fever
  - One or 2 people may feel bad enough to miss work, school

- Serious Reactions
  In the past, about 1,000 people for every 1 million people vacc
  threatening, were serious. These reactions may require medic
  - A vaccinia rash or outbreak of sores limited to one area. This is
    vaccination site and then touching another part of the body or
    where it can damage sight or lead to blindness. Washing hands
    (immediate protection). 
  - A widespread vaccinia rash. The virus spreads from the vacc
    the vaccination site (generally, localized). 
  - A toxic or allergic rash in response to the vaccine that can talk

- Life-Threatening Reactions
  Rarely, people have had very bad reactions to the vaccine. In
  the past, this was experienced in some life-threatening reactions.

Only works if headings are coded properly.
Problem with scanning links quickly and jumping from heading to heading

- On content pages, questions make excellent headings, and, therefore, good anchor links; but questions don't start with the key words. Ideas?

- What is literacy?
- How is adult literacy measured?
- How literate is the adult population?
- Where can I find out about literacy rates in my area?
- How does literacy in the US compare with other countries?
- How can I get funding for my adult literacy program?
- How do I find a nearby literacy program?
- How do I start an adult literacy program?
- Where can I find tutoring materials?
- Where can my organization donate books?
- Where can I get a poster about literacy?
- Where can I volunteer to work with adult learners?
- What are learning disabilities and what is their relationship to literacy?
- Where can I learn about literacy-related policy in my state?
- Is there a National Literacy Day?
- What is International Literacy Day?
- What has NIFL done to raise public awareness about literacy?

What did we learn? – Navigation for users who magnify

Users who magnify

- may develop strategies for getting an overview of the page – or not
- may use the scroll bar and have problems orienting themselves
- may not use the scroll bar and may never get to the right side of the screen
- are mouse-oriented
Seeing the page – at no magnification

[Image of a webpage with categories such as Diseases & Conditions, Safety & Wellness, Drug & Food Information, Families & Children, Aging, Specific Populations, Resource Locators, and Policies & Research.]

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Seeing the page – at 2x

[Image of the same webpage but zoomed in, showing more details of the categories and content.]

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Seeing the page – at 5x

Diseases & Conditions
- Heart Disease, Cancer, HIV
- Mental Health
- Treatment, Prevention, Rehabilitation
- Clinical Trials
- Addictions. Substance Abuse

Developing strategies for seeing the page

- Of our 10 low-vision users
  - 3 used the same magnification throughout
  - 1 sacrificed ease of reading for seeing more
  - 1 used the "lens" option – like a magnifying glass

- 5 had strategies for moving between ease of reading and seeing more
  - rapidly change size in ZoomText
  - use CTRL - scroll wheel on mouse
  - change window size to avoid horizontal scroll
  - copy and paste material into Word and enlarge
What did we learn? – Content for users who listen

Users who listen
- do not understand words when the software mispronounces
- find empty tags like Click here useless
- get confused if the ALT tag and the words on the page differ

Not understanding mispronounced words
- Screen readers do an amazing job of reading English but they are not perfect
  - Words with more than one pronunciation – content, contént
  - Web words – homepage
  - Unusual words – preparedness
  - Made up words – MedlinePlus, LiveHelp
  - Acronyms – NLM, FY
  - Abbreviations – VA
### Not understanding mispronounced words

What you can do to help the screen reader
- Use Skip to main content.
- Write home page as two words.
- Avoid unusual words.
- Do not make up new words.
- Use the `<Acronym>` and `<ABBR>` tags to let the screen reader know what you mean.

### Finding empty tags useless

**Click here**

**More...**

- General questions
  - What is MedlinePlus? [Answer](#)
  - Can you give me some statistics on MedlinePlus? [Answer](#)
- Using MedlinePlus
  - How do I find information about my disease or condition? [Answer](#)
  - I'm not sure how to spell the name of my disease/medical condition. [Answer](#)
  - How do I find the most current research information on my disease? [Answer](#)
  - I found my topic on MedlinePlus, but I really needed treatment. [Answer](#)
  - Why isn't my topic on MedlinePlus? [Answer](#)
  - What is a Local? [Answer](#)
What did we learn? –
Content for users who magnify

Users who magnify
- with magnification and color change, users may mistake left navigation for main content
- if content is done as graphics, it may not magnify
- if a page is not coded well, it may not all magnify
- users may miss items even when the items are next to each other

Mistaking navigation for content – color separates navigation from content
Mistaking navigation for content – with no color, the difference is not clear

Losing the magnification – because content is done as graphics
Losing the magnification – because content is not well-coded

The smallpox vaccine prevents smallpox. For most people, it is safe and effective. Most people experience normal, typically mild reactions to the vaccine, which indicate that it is beginning to work. Some people may experience reactions that may require medical attention.

Normal, Typically Mild Reactions

These reactions usually go away without treatment:

- The arm receiving the vaccination may be sore and red where the vaccine was given.
- The glands in the arm pits may become large and sore.
- The vaccinated person may run a low fever.
- One out of 3 people may feel bad enough to miss work, school, or recreational activity or have trouble sleeping.

Serious Reactions

In the past, about 1,000 people for every 1 million people vaccinated

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Missing items even when they are close to each other on the screen

with no magnification

Please select a state/territory where you would like to search for nursing homes.

State / Territory: [Select a State] [Next Step]

magnified to 5x

The users did not think that the button would be to the right and did not know what to do after selecting the state.
Helping users who magnify find content on the screen

Guidelines:
- Never rely on color alone to convey functional meaning – including background color to define different sections of a web page.
- Do not use graphic images for textual elements like links.
- Use relative sizes for text, not absolute sizes.
- Check style sheets and fonts on actual pages to be sure that all text is enlarging properly – and test on different machines with different browsers and different software.
- Plan the page layout carefully so it works well for users who magnify.

What did we learn? – Forms for users who listen

Users who listen
- can't find the form if its buried on the page or way on the right
- can't use the form if the field labels aren't "well behaved"
- don't hear text that is not connected to a field
- have problems when pages refresh "arbitrarily"
Learning from accessibility research
Presentation at AARP / GSA, July 2004

Not finding the form

Users who listen want to stay in Edit mode. In Edit mode, they will hear words on the screen only if you put them in the tags.

Finding the form difficult to use

If users enter their ZIP Code first, the screen refreshes, and the screen reader starts again at the top of the page.
Designing forms for screen readers

Recommendations:
- Do not put a lot of text on the same page as a form.
- Do not put a form far down on the page or far to the right.
- Make sure that all fields are coded so that users do not have to go in and out of Edit mode. Use the HTML <Label> element. To add more information than is in the label, use the Title attribute.
- Do not put information between fields on a form – unless you include them in the tag for the field.
- Avoid making pages refresh.

What did we learn? – Other issues
- Using assistive software adds a huge mental load.
- Most users do not use all the functionality of their software.
- Many users do not know how to customize all the aspects that they want to change.
- These users are just as impatient as everyone else – but the web is critical to them.
- Separate but equal is not okay.
Discussion –
Users are too diverse for simple solutions

- To help users who listen, we can provide some guidelines for web developers.
- For users who magnify, we can provide many fewer – because their needs vary so much.
- And what about other users . . .

We are taking the wrong approach

Today –
Assistive technologies go on top of "regular" sites

First build site for "most" people.
Then "fix" so site works with "special software."

Can't "fix" enough for everyone.
We need a new paradigm!

Our proposal for a new vision of the web –
- Flexibility
- Portability
- Graceful transformation of the information to address all of the various users’ diverse needs

Bottom up
Individual profiles
Wheelchair analogy
Car analogy – and beyond

Flexibility – part one of our vision

One size does not fit all

Too narrow
Too wide
Just right

images from *The Manual Wheelchair Training Guide*
based on Axelos, Chesney, Minkel, and Perr
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Flexibility from customizing components

RERC on Wheeled Mobility

Portability – part two of our vision

Users should be able to take their personal profiles to any system, and the system should be able to use that profile to customize itself to meet the individual's needs.

Like a car that adjusts seat height, seat length, mirrors for different drivers – but with portability – the key makes those adjustments on any car.
Graceful transformation of the information – part three of our vision

The information must be the same, even if it looks quite different on the screen. And it must be both accessible and pleasing to the user.

Images from www.csszen Garden.com

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Bridging the Gap Between Accessibility and Usability
Guidelines for Accessible – and Usable – Web Sites:
Observing Users Who Work with Screen Readers,
Interactions, x, 6, November-December 2003;
also available in "author's version" as pdf at www.redish.net

Helping low-vision and other users with web sites that meet their needs:
Is one site for all feasible? available as a preprint pdf at www.redish.net