1 HCI and the Web

1.1 HCI – A Quick Reminder
1.2 Web Technology – A Brief Overview
1.3 Web Usability: How Do We Use the Web?
1.4 Designing Web Sites for Usability (contd.)
1.5 Web Accessibility

Literature:
- Steve Krug: Don't Make Me Think, New Riders 2006 (2nd ed.)

Web Resources About Web Usability
- Jakob Nielsen: Alertbox – Current Issues in Web Usability
  http://www.useit.com/alertbox/
- Patrick Lynch, Sarah Horton: Web Style Guide
  http://www.webstyleguide.com
- U.S. Department of Health and Human Services:
  Research-Based Web Design & Usability Guidelines
  http://www.usability.gov/pdfs/guidelines.html
Frames

- “My main recommendation with respect to frames is Frames: Just Say No.” (J. Nielsen)
- Reasons for using frames:
  - Identical layout structure for changing content details
  - Scrolling of content does not scroll other parts (e.g. navigation)
  - Shorter loading times by selective loading of frames
- Key argument against frames:
  - Frames violate a basic paradigm of the Web
- The concept of a Web page unifies four aspects:
  - The user’s view of information
  - The unit of navigation (link)
  - A textual address (URL)
  - The unit of storage and manipulation
- Frames disintegrate these aspects
  - Correspondence View/Navigation, URLs

Example: Frames Can Make Sense
More Problems with Frames

- Printing is difficult
- Bookmarking can be difficult
- Frames are difficult to code and therefore error-prone
- Search engines have trouble to find the right level of composition
- Frames invite to copyright violation
  - Showing foreign content within own frame under own URL

Improving the correspondence URL <-> content [Nielsen]:
- All hyperlinks have `TARGET="_top"` attribute
- For each link, a new frameset is defined (with a different name)
- Complete reload
  - New URL for destination
  - Bookmarking and linking to URL are possible

Alternatives to Frames

- `<OBJECT>`
  - With HTML file as "data" attribute
  - Positioning of object with style sheet
  - Recommended by W3C, few problems with browsers
- `<TABLE>`
  - May lead to very complex pages with nested tables
- `<DIV>`
  - Container for pieces of HTML source
  - Container can be positioned by style sheets (CSS)
  - Order of `<DIV>` entries is relevant for screen readers (see below)

- Note: `<frame>`, `<frameset>` “not to be used by authors” according to HTML 5 specification
  http://www.w3.org/TR/html5-diff/
What are potential problems? (1)

- From http://www.siteusability.com/mistakes.html (now offline):

- **Downright errors:**
  - Broken links or missing images.
  - Firewall errors, server cannot be contacted, directory browsing not allowed (or allowed?).
  - Scripting errors that pop up an error message, make the page unusable, or write strings of gibberish amongst the text.
  - HTML coding errors that mean the page doesn't display properly, or at all.

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What are potential problems? (2)

- **Annoying or inaccessible page design:**
  - An "entrance tunnel" or splash screen - lots of flashy imagery but no real content that requires a click to get to the real home page.
  - Pages with such poor contrast between background and text they are hard to read.
  - Text in tiny or illegible fonts.
  - Pages that take minutes to download (even worse if when they have finished, you weren't interested in the content anyway).
  - Content that requires a specialised plug-in to read it.
  - Pages that require a specific browser to display nicely.
  - Links that lead to "under construction" pages.
  - Link colour schemes where you can't tell which ones you have already visited.
  - Links with badly-chosen targets that display numerous hidden windows on the desktop, break the Back button, or display pages without the necessary menus to use them properly.
  - Forms where you don't know what the site owners want to do with the information you are asked to supply.
  - Forms that don't explain properly what you need to enter, or don't let you go back and amend any errors.
  - Pages with typographical or grammatical errors, confusing and poorly-written text, or inconsistent terminology.
What are potential problems? (3)

- **Search engine problems:**
  - Pages with no links to other pages in the site.
  - Pages called "No title", "Untitled", "Insert document title here", and/or with a meaningless abstract, so the user has no idea if the link is relevant or not.
  - Pages that no longer exist on your site because you moved or renamed them.
  - Pages so poorly designed they will never even appear in a search engine listing.

What are potential problems? (4)

- **Information architecture problems:**
  - Pages with different layouts and appearance for the same kind of information.
  - Very long pages with no quick way to skip about them.
  - Forms that don't work in a comprehensible way, and shopping cart systems that confuse in their complexity.
  - Links that lead to mystery destinations (e.g. "click here"), or to other sites without warning.
  - Overwhelming numbers of links on the home (or other) page.
  - Menu options or navigation bar icons that mean little to the average visitor.
  - No consistent way to move around the site on every page.
  - No clear distinction between different kinds of information.
  - Confusing site structure so the visitor cannot guess where to go for information.
What are potential problems? (5)

- **E-commerce problems:**
  - Potential buyers can't find the product they want because they don't understand the categories you have chosen.
  - Visitors leave without purchasing because they don't want to register.
  - Visitors can't find your returns policy or how their privacy is protected if they buy from you.
  - Buyers have to work out the shipping and handling charges for themselves when viewing an item in your online catalogue.
  - Visitors from overseas don't understand the measurement system you use for sizes or weights.
  - ... the list of potential problems is endless - this just skims the surface for sites selling to the consumer.

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**Web Search**
• Navigation

• Search form pages
Advanced search pages
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- J. Thatcher et al.: Constructing Accessible Web Sites, glasshaus 2002
**General Goal**

- Accessibility for users with disabilities – why?
  - Regulatory compliance – see below
  - Human decency
  - Business reasons
  - One of the main ideas of the web: Content adjusts to user/device
- Disability in web usage is different from “common definition” of disability
  - Example: Wheelchair usage
  - Many disabilities in general life do not affect web usage
  - For web usage, specific disabilities are relevant
    » e.g. Problems with eyesight, handling keyboards
- Improving accessibility is important beyond the group of users with disabilities
  - Impetus to reduce information to the essential
  - Helpful also for "normal users"

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**Statistics**

- Online buyers are of relatively high age in average
  - Computerworld 1999:
    » Age group with highest concentration of online buyers is 59–64
    » Ernst & Young: 7 of 10 online buyers are over 40
- Percentage of people with disabilities increases with age
  - 18-24: 9.5%
  - 45-54: 21.2%
  - 55-64: 34%
  - 75+: 64%
Types of Disabilities

- Vision
  - Blind users (using screen readers, audio browsers, text browsers, Braille output)
  - Colorblind users (in particular red-green)
  - Reduced eyesight (large fonts, high contrast)
  - People under special conditions (e.g. car browsers)
- Hearing
  - Deaf users (do not hear content of spoken audio explanations, or audio track of video)
- Physical abilities
  - Speech disabilities (problematic for speech input)
  - Problems in pointing with a mouse (motor disabilities)
- Cognitive abilities
  - Problems in understanding → Better comprehensibility for all users!

Debunking Myths about Accessibility

- Myth: Accessible pages have to be plain
  - Good usage of colours helps the average user
  - Short and simple texts make pages better “scannable”
  - Optimization for text output reduces loading time (up to display of essential information)
  - See the power of CSS: http://www.csszengarden.com/
- Myth: You just have to add a text-only version
  - Order of text entries is important for text-based usability
  - There are other disabilities than blindness!
  - Two-version problem
  - “Extra” web site marginalizes disables users
**Assistive Technology:**
**Audio Browsing with Screen Reader**

- Listening to text
- Interaction?
- Browsing?
- Skipping over irrelevant entries?
- Why put distracting entries into the path?

**ALT tags**

- Alternative way of “displaying” images
  - Gives some information to users who cannot see the picture
    » “Photo of Jakob Nielsen”
  - Can help to support low-bandwidth browsing
  - Described images?
  - Decorative images: ALT text should be empty!
  - Trick: Audio information only for users not seeing images, as alt text for invisible graphic. (Usually, aural CSS is preferable!)

- Generalization:
  - Subtitles for video information
Font Resizing

- Increasing font size for better readability:
  - Using global assistive technology like magnifier utility
    » Independent of application
  - Increasing font size in browser settings/dialogue
    » Should be supported by page design (no absolutely sized fonts)
    » "Fluid" page design is helpful
  - Increasing font size through special controls on web page
    » Special control may even disturb users relying on plain text
    » Reminder of alternative viewing styles

Regulatory Situation

- USA:
  - Section 508 of the Rehabilitation Act (1998)
    » Federal agencies are required to comply with some accessibility rules
    » www.section508.gov
- EU:
  - E-Europe Initiative (1999) – refers to WAI (see below)
- Deutschland:
  - Gesetz zur Gleichstellung behinderter Menschen und zur Änderung anderer Gesetze" (Behindertengleichstellungsgesetz BGG), 27.4.2002
    » Verpflichtet Bundesverwaltung, alle Angebote barrierefrei zu gestalten
  - BITV: Verordnung zur Schaffung barrierefreier Informationstechnik nach dem Behindertengleichstellungsgesetz
    » http://bundesrecht.juris.de/bitv/
- International:
  - W3C Web Accessibility Initiative (WAI)
Web Accessibility Initiative (WAI)

- Set of standards developed by W3C (WWW consortium)
- Web Content Accessibility Guidelines (WCAG), 1999
  - Making Web content accessible, primarily for disabled users
  - WCAG 1.0: May 1999, 14 rules
  - WCAG 2.0: "Proposed Recommendation" in late 2008?
    4 principles, 12 guidelines, numerous accompanying documents
- Authoring Tool Accessibility Guidelines (ATAG)
  - Towards an HTML editor which is usable for disabled people
- User Agent Accessibility Guidelines (UAAG)
  - Recommendations for developers
- XML Accessibility Guidelines (XAG)
  - How to include features in XML which promote accessibility.
- Much more, e.g. evaluation-related standards
  - EARL (Evaluation and Report Language)
  - Accessibility of AJAX applications: ARIA

Core WAI Content Recommendations 1.0

10 Quick Tips

The links in the Quick Tips below mostly go to the techniques documents that provide implementation guidance - including explanations, strategies, and detailed markup examples.

1. **Images & animations**: Use the `alt` attribute to describe the function of each visual.
2. **Image maps**: Use the `client-side map` and `text for hotspots`.
3. **Multimedia**: Provide `captioning and transcripts of audio`, and `descriptions of video`.
4. **Hyperlink links**: Use text that makes sense when read out of context. For example, avoid "click here."
5. **Page organization**: Use `headings`, `lists`, and consistent structure. Use `CSS` for layout and style where possible.
6. **Graphs & charts**: Summarize or use the `longdesc` attribute.
7. **Scripts, applets, & plug-ins**: Provide `alternative content` in case active features are inaccessible or unsupported.
8. **Frames**: Use the `noframes` element and meaningful `titles`.
10. **Check your work**: Validate. Use tools, checklist, and guidelines at [http://www.w3.org/TR/WCAG](http://www.w3.org/TR/WCAG)

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**BITV (Auszug) (1)**

<table>
<thead>
<tr>
<th>Anforderung</th>
<th>6</th>
<th>Internetangebote müssen auch dann nutzbar sein, wenn der verwendete Benutzerebenen- neuer Technologien nicht unterstützt oder diese deaktiviert sind.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedingung</td>
<td>6.1</td>
<td>Es muss sichergestellt sein, dass mittels Markup-Sprachen geschaffene Dokumente verwendbar sind, wenn die zugeordneten Stylesheets deaktiviert sind.</td>
</tr>
<tr>
<td></td>
<td>6.2</td>
<td>Es muss sichergestellt sein, dass Äquivalente für dynamischen Inhalt aktualisiert werden, wenn sich der dynamische Inhalt ändert.</td>
</tr>
<tr>
<td></td>
<td>6.3</td>
<td>Es muss sichergestellt sein, dass mittels Markup-Sprachen geschaffene Dokumente verwendbar sind, wenn Scripts, Applets oder andere programmierte Objekte deaktiviert sind.</td>
</tr>
<tr>
<td></td>
<td>6.4</td>
<td>Es muss sichergestellt sein, dass die Eingabebehandlung von Scripts, Applets oder anderen programmierten Objekten vom Eingabegerät unabhängig ist.</td>
</tr>
<tr>
<td></td>
<td>6.5</td>
<td>Dynamische Inhalte müssen zugänglich sein. Insoweit dies nur mit unverhältnismäßig hohem Aufwand zu realisieren ist, sind gleichwertige alternative Angebote unter Verzicht auf dynamische Inhalte bereitzustellen.</td>
</tr>
</tbody>
</table>

- Must be adhered to by all websites run by government organisations, universities, other official bodies
- Most rules inspired by corresponding WCAG 1.0 rules

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**BITV (Auszug) (2)**

<table>
<thead>
<tr>
<th>Anforderung</th>
<th>7</th>
<th>Zeitgesteuerte Änderungen des Inhalts müssen durch die Nutzerindividuell kontrollierbar sein.</th>
</tr>
</thead>
<tbody>
<tr>
<td>Bedingung</td>
<td>7.1</td>
<td>Bildschirmflackern ist zu vermeiden.</td>
</tr>
<tr>
<td></td>
<td>7.2</td>
<td>Blinkender Inhalt ist zu vermeiden.</td>
</tr>
<tr>
<td></td>
<td>7.3</td>
<td>Bewegung in mittels Markup-Sprachen geschaffener Dokumente ist entweder zu vermeiden oder es sind Mechanismen bereitzustellen, die der Nutzerindividuell das Einleiten der Bewegung oder die Änderung des Inhalts ermöglichen.</td>
</tr>
<tr>
<td></td>
<td>7.4</td>
<td>Automatische periodische Aktualisierungen in mittels Markup-Sprachen geschaffener Dokument sind zu vermeiden.</td>
</tr>
<tr>
<td></td>
<td>7.5</td>
<td>Die Verwendung von Elementen der Markup-Sprache zur automatischen Weiterleitung ist zu vermeiden. Insofern auf eine automatische Weiterleitung nicht verzichtet werden kann, ist der Server entsprechend zu konfigurieren.</td>
</tr>
</tbody>
</table>

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