Vorlesung
Advanced Topics in HCI
(Mensch-Maschine-Interaktion 2)

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Chapter 1: HCI and the WWW

Table of Content

- Human Computer Interaction (HCI)
  - a quick reminder
- Web Usability
  - Web Technology
  - Web Design
  - Management of Web projects
  - Usability evaluation of Web sites and applications
- Web Accessibility, Universal Access to Information
- Usability Report

Organizing Information

http://www.webstyleguide.com

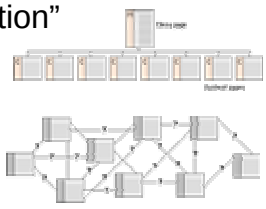
There are five basic steps in organizing your information:

1. Divide your content into logical units
2. Establish a hierarchy of importance among the units
3. Use the hierarchy to structure relations among units
4. Build a site that closely follows your information structure
5. Analyze the functional and aesthetic success of your system

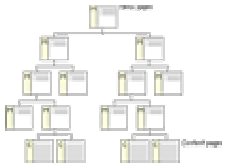
"Chunking Information"

http://www.webstyleguide.com

- Hierarchy of importance
- Relations
- Functions

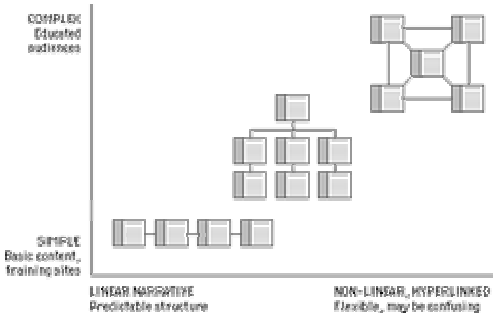


- The most important step in planning your site is to organize your information!
- Examples of extreme structures



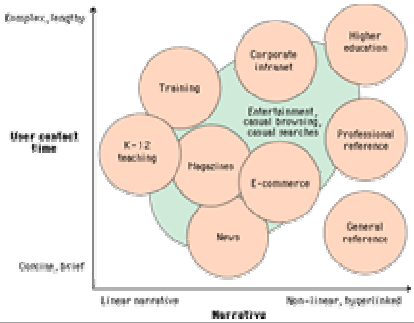
Basic Organization Patterns

http://www.webstyleguide.com



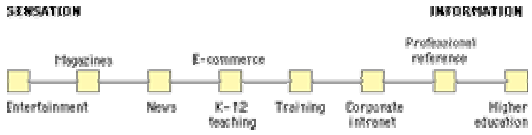
Site Design Themes (1)

http://www.webstyleguide.com



Site Design Themes (2)

http://www.webstyleguide.com



- Design, technology, and structure has to fit the anticipated target user
- Consider time spend on a page, attention span, and main goal of the user

Site Design Themes (3)

http://www.webstyleguide.com

- Training
- Teaching
- Continuing education
- Reference
- Entertainment and magazine sites
- News sites
- E-commerce

Site Elements

http://www.webstyleguide.com

- When designing a site the basic site element can help to create a clear design, examples are:

- Home pages
- Information pages ("the meat")
- Menus and subsites
- Resource lists, "other related sites" pages
- Site guides
- "What's new?" pages
- Search features
- Contact information and user feedback
- Bibliographies and appendixes
- FAQ pages
- Custom server error pages

Site Elements – Home page

http://www.webstyleguide.com

- Logical entry point to a site, often the most visited page on a site
- First impression – everything that is really important has to be visible without scrolling
- All pages in the site should link back to this page
- Typical function
  - Show important content and news
  - Link to all parts of the site (home for navigation)
- Home page types
  - Link/navigation/menu page
  - News pages
  - Path-oriented pages (dividing the visitors - *information for …*)
  - Splash screens/cover page (be careful! hard to make them useful!)
  - Combined (Navigation with paths, news integrated)
- Home pages have often a distinctive layout within a site

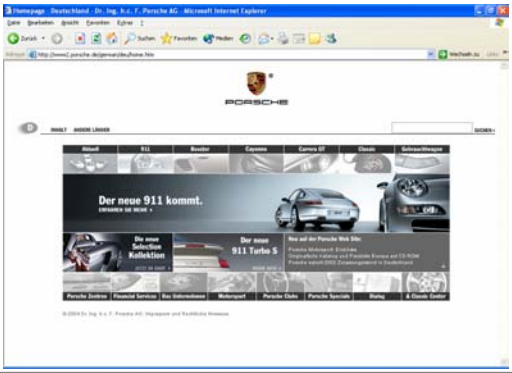
Home Pages – Example 1

Combined

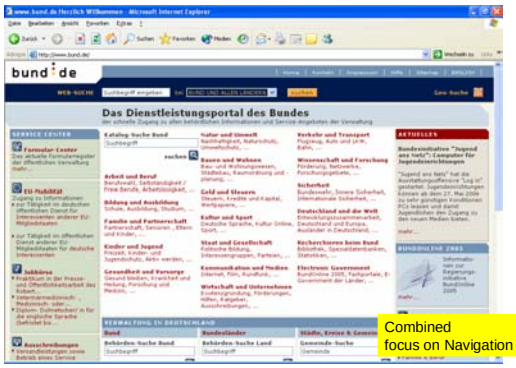
Home Pages – Example 2

Combined
News central
Path oriented navigation

Home Pages – Example 3

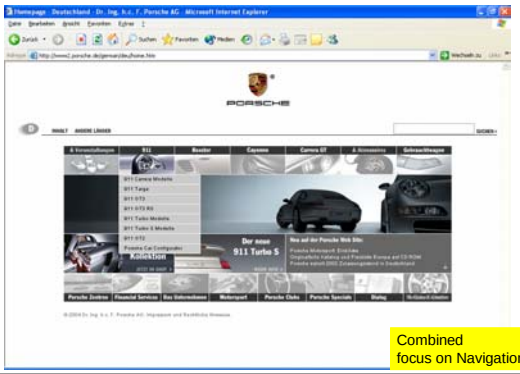


Home Pages – Example 5



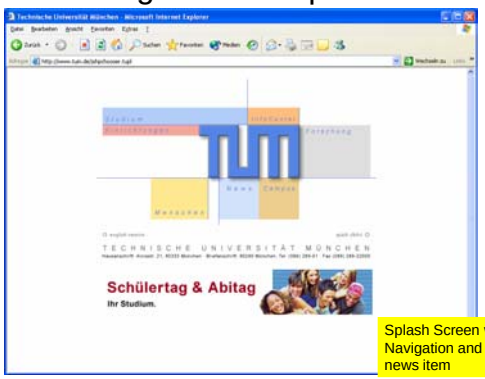
Combined
focus on Navigation

Home Pages – Example 3



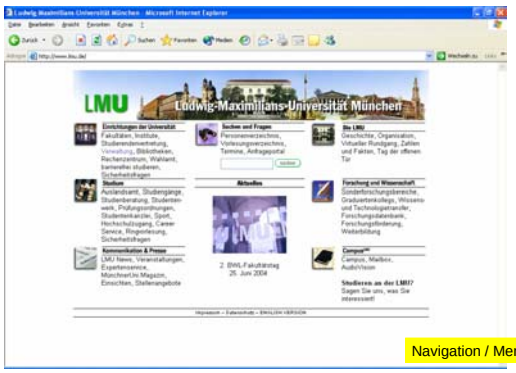
Combined
focus on Navigation

Home Pages – Example 6



Splash Screen with
Navigation and one
news item

Home Pages – Example 4



Navigation / Menu

Home Pages – Example 7

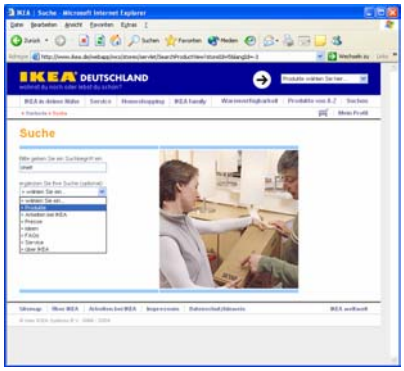
Combined
Direct access to
services (e.g. hotels,
map, events)

Site Elements – Search, Site Guides

http://www.webstyleguide.com

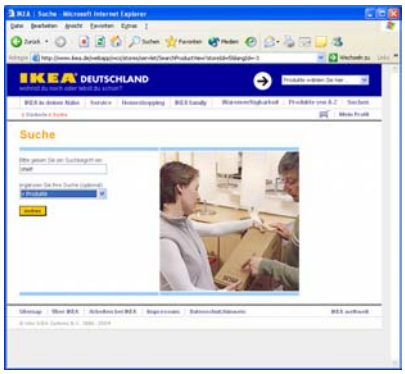
- Site Guides / Site Maps
  - Provide an overview (you can't flip trough the pages of a web site)
    - extent & size
    - organization
    - and context
  - Tables of contents
  - keyword indexes of the information in your Web
- Search
  - For large sites a "must"
  - Update the search content for each change or on daily basis
  - Complement to navigation and site guide – not replacement
- "What is new"
  - If pages change often and visitors look for new content
  - For regular visitors
  - Listing of recent changes / additions
  - E.g. online software archive

Index – Search



Site Map – Example

Index – Search



Index – Example

Site Elements – Contact information and user feedback

http://www.webstyleguide.com

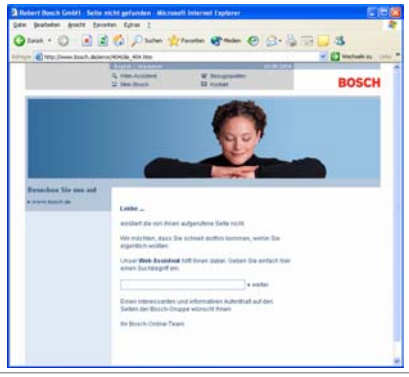
- Contact Information
  - Information other way to make contact
    - At least Email
  - Depending on the purpose of the site
    - Postal address
    - Visitors address, map, directions, parking, public transport, …
    - Phone & Fax
    - …
- Feedback
  - Private feedback: Forms, Email
  - Public feedback: Guestbook
  - Be aware of the implications of public feedback
  - Feedback requires someone to handle it!
- In Germany in most cases an "Impressum" is required
  - Teledienstegesetz §6
  - If the site provides "geschäftsmäßige Teledienste"
  - See Teledienstegesetzes (TDG)

Site Elements – FAQ

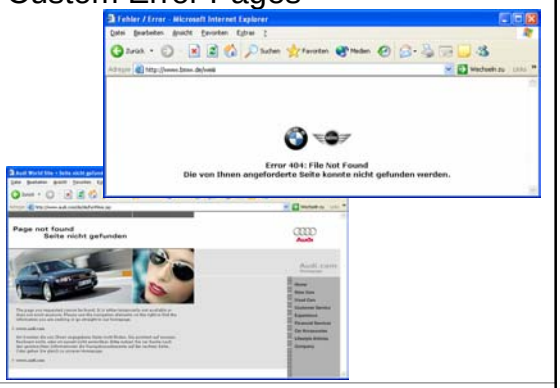
http://www.webstyleguide.com

- FAQ – Frequently Asked Questions
- Can help to
  - Increase usability
  - Decrease support spending
- To build up FAQs
  - Answer question received by support/comments/feedback
  - Check if the question can be avoided (e.g. by adding information at the right place)
  - If question can not be avoided and is generally relevant (if you expect someone else with the same question)
    - Generalize question and answer
    - Add to FAQ

Custom Error Pages



Custom Error Pages



Accessibility & Universal Design

Accessibility & Universal Design

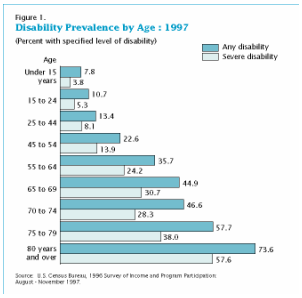
- Why is it an Issue? Why is it important?
- Types of Disabilities
- Design Principles
- Assistive Technologies
- Web Content Accessibility
- Accessible Software

Accessibility & Universal Access … why is it important?

- Figures from the USA
  - In 1997, 52.6 million people (19.7 percent of the population) had some level of disability
  - 33.0 million (12.3 percent of the population) had a severe disability.
  - About 10.1 million individuals (3.8 percent of the population) needed personal assistance
  - 2.2 million used a wheelchair.
  - Another 6.4 million used some other ambulatory aid such as a cane, crutches, or a walker.
  - About 7.7 million individuals and letters in ordinary newspaper print; of them, 1.8 million were unable to see.

From http://www.census.gov/hhes/www/disable/sipp/disab97/asc97.html

Accessibility & Universal Access … why is it important?



From http://www.census.gov/hhes/www/disable/sipp/disab97/asc97.html

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
Brandon Goldsworthy, Shaun Kane, Tony Sindelar

Types of disabilities

- Visual
  - Blindness
  - Low vision
  - Color blindness
- Hearing
- Motor skills
- Cognitive disability
  - Reading disorders
  - Attention disorders
  - Memory impairments

Accessibility & Universal Access … why is it important?

- Figures from Germany
  - 155.000 blind people
  - 500.000 visually impaired
  - 1,1 Million have motor deficiencies (movement and control of body parts)
  - 236.000 are hard of hearing or deaf
- Assistive technologies
  - use associative technologies is widespread in these groups (~30%)
  - Large screens and magnified presentation
  - Braille Displays
  - Text to speech (screen readers)
  - Speech input and speech control
  - Special keyboards and input devices (if motor control for standard mouse and keyboard is not sufficient)
- Source: http://www.behinderten-ratgeber.de/forum/statistiken1.htm

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Blindness

- User cannot see visual content
  - Pictures, diagrams, animations, etc.
- May use a screen reader to get information
  - Cannot scan a page quickly
  - Must navigate linearly through text
- Solutions
  - Provide structure to text for easy navigation
  - Add text or audio descriptions to images/video
  - Follow standards for maximum compatibility with screen readers

Accessibility & Universal Access … why is it important?

- Legal requirements
  - In Germany:
    - Behindertengleichstellungsgesetz http://www.behindertenbeauftragter.de/gesetzgebung/behindertengleichstellungsgesetz
    - Verordnung zur Schaffung barrierefreier Informationstechnik nach dem Behindertengleichstellungsgesetz http://www.behindertenbeauftragter.de/gesetzgebung/behindertengleichstellungsgesetz/rechtsverordnung/rvo11bgg
  - USA
    - Section 508 http://www.section508.gov/
- Timeframe (Germany)
  - 31. December 2005 for general information
  - 31. December 2003 for information that is targeted at people with disabilities

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Low vision

- Many types
  - Poor vision quality
  - Partially occluded vision
- Very common in seniors
- Low-contrast text difficult to read
- Solutions
  - Allow font resizing
  - Allow color schemes to be changed
  - Add text or audio descriptions to images/video

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Color blindness

Vischeck

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Color blindness

- Inability to distinguish between certain colors
  - Affects 10% of males
  - Often have problems with red and green
- Solutions
  - Allow color schemes to be changed
  - Don't differentiate on hue alone
    - Saturation
    - Value
    - Shape

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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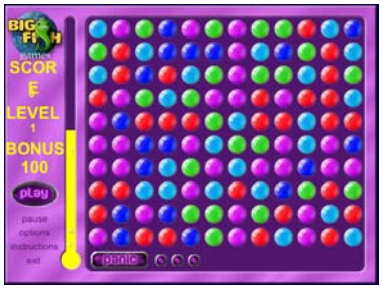
Is this accessible?



Big Fish Games

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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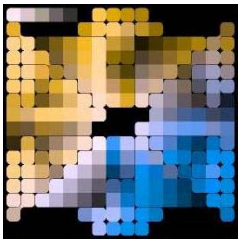
Color blindness

What most people see



What color-blind users see

visibone.com

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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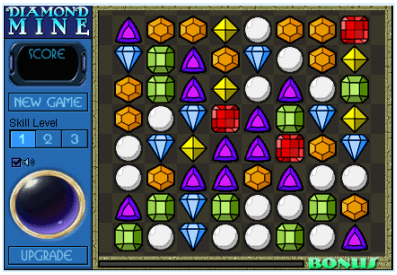
Better



PopCap Games

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Hearing impairment

- User cannot hear audio content
- This one is easy to test for
  - Turn off your speakers!
- Solution
  - Provide captioning for all audio content

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Universal design principles

- Equitable Use
  - The design is useful and marketable to people with diverse abilities
- Flexibility in Use
  - The design accommodates a wide range of individual preferences and abilities
- Simple and Intuitive Use
  - Use of the design is easy to understand, regardless of the user's experience, knowledge, language skills, or current concentration level.
- Perceptible Information
  - The design communicates necessary information effectively to the user, regardless of ambient conditions or the user's sensory abilities.

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Impaired motor skills

- Difficulty using mouse and keyboard
  - Inaccuracy while clicking
  - Slow input
  - May use specialized input device
- Solutions
  - Do not require precise clicking
  - Allow alternate input methods
    - Keyboard
    - Mouse
    - Voice

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Universal design principles

- Tolerance for Error
  - The design minimizes hazards and the adverse consequences of accidental or unintended actions
- Low Physical Effort
  - The design can be used efficiently and comfortably and with a minimum of fatigue
- Size and Space for Approach and Use
  - Appropriate size and space is provided for approach, reach, manipulation, and use regardless of user's body size, posture, or mobility

From: http://portal.cs.umass.edu/fundamentals/Usability_05_Accessibility.pdf
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Cognitive disabilities

- Many types
  - Learning disabilities
  - Attention deficit disorder
  - Memory impairments
  - Impairments of intelligence
- May have difficulty focusing on or processing information
- Solutions
  - Clear, simple design
  - Simple navigation
  - Avoid distracting elements (video, navigation)

Assistive Technologies Screenreader

- Software that reads what is on the screen
- Provides navigation
- Integrates with application software
- Example: JAWS
  - Includes a software speech synthesizer
  - Can output to Braille display
  - Demo: http://www.freedomscientific.com/fs_downloads/jaws.asp
- Example: IBM Home page reader
  - Especially designed for web browsing
  - Reads text, table, frames, forms, ALT-tags
  - Works with selected JavaScript code and Plug-Ins
  - Demo: http://www-5.ibm.com/de/accessibility/hpr.html

Assistive Technologies
Braille Displays

http://www.accesstech.ch/

- Used with a JAWS screen reader
- refreshable Braille cells act as a tactile monitor (e.g. 44-, 70- and 84-cells)
- Unidirectional advance bars and Whiz Wheels for navigation. .
- buttons are individually (Navigation controls are on the display)
- >5000 €

http://www.sightandsound.co.uk/

Assistive Technologies
Screen Magnification

- Demo
- Problems with fonts and bitmaps

Assistive Technologies
Braille Printer

- E.g. Basic-S Printer
- Speed
  - 150 PPH (pages per hour) or 39 CPS (characters per second).
- Technology
  - 6 High quality hardened hammers forming against hardened steel anvils

http://www.sightandsound.co.uk/

Web Content Accessibility Guidelines 1.0

- http://www.w3.org/TR/WCAG10/

Assistive Technologies
Speech input, Voice control

- Software to input text and commands to the system

Web Accessibility Evaluation

- Guidelines available from W3C http://www.w3.org/TR/2004/WD-WCAG20-20040311/
- Guidelines are divided into three categories of success criteria:
  - Level 1 success criteria:
    - do not specify how information is presented
    - are reasonably applicable to all Web sites
    - some are machine-testable. Others require human judgment. Success criteria that require human testing yield consistent results among multiple testers.
  - Level 2 success criteria:
    - may require an author to present content in particular ways
    - are reasonably applicable to all Web sites
    - some are machine-testable. Others require human judgment. Success criteria that require human testing yield consistent results among multiple testers.
  - Level 3 success criteria**:**
    - are additional criteria that go beyond Level 1 and 2 that may be applied to make sites accessible to more people with all or particular types of disability
  - Conformance
    - WCAG 2.0 A, WCAG 2.0 A+, WCAG 2.0 AA, WCAG 2.0 AAA

QUICK TIPS TO MAKE ACCESSIBLE WEB SITES

http://www.w3.org/WAI/References/QuickTips/

- ***For Complete Guidelines & Checklist: www.w3.org/WAI***
- **Images & animations:** Use the **alt** attribute to describe the function of each visual.
- **Image maps.** Use the client-side **map** and text for hotspots.
- **Multimedia.** Provide captioning and transcripts of audio, and descriptions of video.
- **Hypertext links.** Use text that makes sense when read out of context. For example, avoid "click here."
- **Page organization.** Use headings, lists, and consistent structure. Use **CSS** for layout and style where possible.
- **Graphs & charts.** Summarize or use the **longdesc** attribute.
- **Scripts, applets, & plug-ins.** Provide alternative content in case active features are inaccessible or unsupported.
- **Frames.** Use the **noframes** element and meaningful titles.
- **Tables.** Make line-by-line reading sensible. Summarize.
- **Check your work.** Validate. Use tools, checklist, and guidelines at http://www.w3.org/TR/WCAG

Software to check guideline some examples…

- Bobby: http://bobby.watchfire.com/bobby/html/en/index.jsp
  "This free service will allow you to test web pages and help expose and repair barriers to accessibility and encourage compliance with existing accessibility guidelines, such as Section 508 and the W3C's WCAG. To learn about products to test websites of all sizes for accessibility issues, please visit the accessibility section on www.watchfire.com."
- A-promt: http://aprompt.snow.utoronto.ca/
  "Web authors can use A-Prompt to make their Web pages accessible to people with disabilities. The A-Prompt software tool examines Web pages for barriers to accessibility, performs automatic repairs when possible, and assists the author in manual repairs when necessary. These enhanced Web pages are available to a larger Internet audience. "
- http://www.anybrowser.com/
- http://www.barrierekompass.de/
- http://validator.w3.org/

References

- http://www.w3.org/WAI
- http://www.evaluieren.de/infos/links/barriere.htm#behindertengerecht
- http://www.barrierefreies-webdesign.de/bitv/anforderungen.php
- http://www.wob11.de/info/doc/tipps+tools.htm