

CSC 3461

Design for the Web

Sources

- Jacob Nielsen's Website
 - <http://www.useit.com>
- Vincent Flanders' Web Pages that Suck.com
 - <http://www.webpagethatsuck.com>
- Research-Based Web Design & Usability Guidelines
 - <http://usability.gov/guidelines/>
- J. Johnson (2000)
GUI Bloopers
- W. O. Galitz (2002)
The Essential Guide to User Interface Design
- P. Greenspun (1999)
Philip and Alex's Guide to Web Publishing
- J. Nielsen (2000)
Designing Web Usability: The Practice of Simplicity

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Illustrative Examples

- <http://www.aceofcakestv.com/>
- <http://www.microsoft.com/en/us/default.aspx>
- <http://www.fredfrap.com/>
- <http://www.thecreationmuseum.org/>
- <http://www.usabilitynet.org/home.htm>
- <http://www.openbexi.com/>
- <http://www.kthecatalog.com/>
- <http://www.tallyhouniforms.com/>
- http://www.bvsinc.com/buick_nash/lobby.asp
- <http://www.dokimos.org/aiff/>
- <http://web.archive.org/web/20060613061524/http://moire.ch/>
- <http://www.w3.org/WAI/wcag-curric/sam91-0.htm>

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Basics

- Who holds what domain names?
 - hostname instead of a machine's numerical address (predates TCP/IP)
 - The whois database for the .com and .net domains
 - Each national domain (.uk, .fr, etc.) has its own registrars
- websites / webpages
 - ~70 million / ~29.7 billion (Feb, 2007)
 - ~40 million / ~3 billion pages (Dec, 2003)
 - mean webpages per website? ~273 (??)

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What is a web page?

- An “information set”:
 - Consists of:
 - Rendered (perceived) elements (text, images, hyperlinks etc)
 - Internal/hidden elements (comments, metadata)
 - requested of and served from web servers (http) to browser (GUI/ text-based)
 - BrowserCam eg.
- The web is a hypertext system
 - Other hypertext systems:
 - Apple HyperCard
 - Xerox NoteCards
 - Memex (Vannevar Bush, 1945, not implemented)

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Types of web pages

- Strong association with the “Internet economy”
 - Purchase products, software applications, software upgrades, services
 - Entertainment
 - Access patches, upgrades, documentation, help associated with purchases
- Not-for-profit
 - public service, charities
- How much do the guidelines for design depend on the purpose of the webpage?

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What are the issues?

- Depends on your approach:
 - Artistic approach:
 - Express yourself, an artistic endeavour
 - e.g., Fine Arts and Cultural Studies, Interactive Multimedia I, II
 - York courses: FACS 2930 6.0, FACS 39230 6.0
 - Engineering approach:
 - Solve a problem for a customer
 - Who is the “customer”?
 - The publisher of the website, its visitors, or both?
 - Treat the web project like a software development project

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Common Web Usability Problems

- Content authoring: imposition of linear structure
- Linking strategies & entry points
- Linking to non-Web documents (within or outside the current browser window?)

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Common Web Usability Problems

- Slow downloads
 - large and multiple images, animation, etc ...
 - Ecological validity (internal demo vs real world)
- Unnecessary graphical elements
 - Distracting, gratuitous animation that runs continuously in the background
- Lack of consideration of browser rendering
 - users need to scroll down or across the page to see important content.
- Lack of consideration of browser's real estate
 - text formatted in fixed-width or proportional-width blocks
 - let the width of the user's browser determine the width of the text

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Web design issues

- Linking strategy
 - your website does not exist in a vacuum
 - what links to include to other websites?
 - how will others link to you?
 - need to provide "entry-points"
- Content authoring
 - easy to use a linear style of presentation, but want to avoid it
 - how to write in the new style that is optimized for online readers?
- Page design
 - the page is "rendered" by different browsers
 - browsers access the page under different circumstances
 - speed of download, version of html that is understood, screen used
 - the page is visited by different users

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Main Topics

- Page Design
- Content Design
- Site Design
- Intranet Design
- Accessibility
- Internationalization

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Page Design

- Screen Real Estate
- Cross-platform design; the Separation of Meaning / Presentation; Style Sheets
- Response Times
- Linking

- Frames

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Page vs Site Design

- For usability, site design is more important than page design
 - users are never going to get close to the correct page unless the site is:
 - structured according to user needs, and
 - contains a navigation scheme that allows people to find what they want
- navigation is not a goal in itself; should be minimized

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Screen Real Estate

- Impossible to predict size and resolution of monitor
 - cf traditional GUI design, where the designer controls every pixel on the screen
- “Pixel allocations” should be specified in terms of ratios not absolute units
 - content should account for 50-80% of real estate
 - ratio of real estate for page overhead (navigation) depends on type of page
 - home page, intermediate 20+%
 - destination pages <20%
 - ads count as page overhead
 - whitespace - heuristic is ~30%

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Whitespace

- can guide the eye
- help the user understand the grouping of information
- if missing, design can be overly compact
- is not wasted space if it is part of content or navigation design

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Guidelines for Page Design

- Heuristic: simplicity over complexity
 - iterate over all design elements one at a time and remove them
 - does design still work? if yes, remove it
 - 5 bytes = 1msec download time

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Cross Platform Design

- Can't assume any particular point of access:
 - traditional computer
 - PDA
 - mobile phone
 - other internet devices (game consoles)
- Can't assume any particular browser:
 - Current stats:
 - Firefox: 36.5%,
 - IE5/6/7: 1.7%/30.7%/22.0%
 - 50 different browser models for mobiles
- Bandwidth: can differ by a factor of 1000
 - (modem vs T3)

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Browser Rendering

- Browser behaviours can differ
- e.g., BrowserCam

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Resolution-Independent Design

- Screen areas:
 - very small (640x480 or less)
 - small (800x600)
 - medium (1024x768)
 - large (1280x1024 or larger)
- even in 1999, very small screen size accounted for ~20% of access
- Accommodations in screen area:
 - Traditional GUI design: a factor of 6
 - laptop vs high-end workstation
 - Web design: a factor of 100
 - hand-held vs workstation

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Resolution-Independent Design

- Since you have no way of knowing how large of a screen your users will have, need to design for all screen resolutions
- page should adapt to whatever screen size is available
- fixed pixel-widths for tables, frames, or other design elements lead to problems
- icons: higher the resolution, the smaller they will appear
 - should still work at 100dpi or higher
- can't know the user's specified fonts, need a design that works with a variety of fonts
- don't embed appearance specifications in the content
- information relating to the presentation should be kept in a separate style sheet

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Size of Pages

- Use short pages (1-2 screens in length) for
 - home pages and all navigation pages
 - pages that need to be quickly browsed and/or read online
 - pages with very long graphics
- Use long pages (more than 2 screens) to
 - match the structure of a paper counterpart
 - make pages more convenient to download/print

http://usability.gov/guidelines/page_length.html#length

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Page design

- Avoid horizontal scrolling
- Vertical scrolling may be unavoidable
 - Place critical or important information at the very top so it is always viewable without scrolling
 - Anticipate page breaks

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Style Sheets

- Information relating to the presentation should be kept in a separate style sheet
 - for each site, all the style sheets should be consistent
- Content should retain a decent presentation if user disables style sheets

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Resolution-Independent Design

- The printer - a special kind of display
 - Typical 600x800 design typically is 8.3" wide when printed at standard resolution (72 pixels/inch)
 - Printable area on 8.5x11" is 7.5-8.0" wide

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Response Time

- Components of delay:
 - throughput of server
 - server's connection to the Internet; user's connection to the Internet
 - Internet itself
 - Rendering speed of user's browser
- Traditional human factors research on a wide variety of hypertext systems:
 - users need sub-second response time for inter-page movement
 - Latencies and Perceptions
 - 0.1 sec - threshold for perception of "instantaneous" reaction
 - 1 sec - threshold for feeling that one is operating directly on the data
 - 10 sec - threshold for retention of user attention
 - In addition to speed, consistency/predictability is important

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Response Time

- Max page sizes for 1 sec/10 sec response time
 - Modem: 2 Kb/34 Kb
 - ISDN: 8 Kb/150 Kb
 - T1: 100 Kb/2 Mb
- Heuristic:
 - sizes should be given for files that will take more than 10 seconds to download at the prevalent bandwidth
- Use web analytics to determine the bail out rate as a function of file size (among other factors)

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Response Time

- Top of page should be meaningful even before any images have downloaded
- Use ALT attributes
- Split complex tables into several smaller tables; the first table should be simple/fast to render

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Links

- Has two ends: departure and destination
- Be cautious about use of non-standard link colors
 - conventions
 - unvisited: blue
 - previously visited: purple/red
 - Correlation of $r=0.4$ between using standard link colours and task success
 - not the most important factor, but this factor does matter

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Links

- Don't make anchors too long (max 2-4 words)
 - Why? Anchors give user's eyes something to rest on which scanning through the content
 - If too many words, then meaning can't be picked up by scanning
- Include non-anchor verbiage:
 - don't expect users to follow links to find out what they are about)
- Include "link title" to get "tool tip" pop-ups:
 - indicate the type of information that can be expected from following the link, other information (e.g., registration req'd)
 - `anchor text`
- Include glyphs to distinguish internal/external link
 - (e.g., Wikipedia)
- Avoid the anchor "Click Here"
 - words are low content; also can't assume click

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Links

- "Mystery meat navigation"
 - means having to "mouse over" icons to see what they correspond to
 - DO NOT USE! Violation of fundamental principle of design

<http://www.fixingyourwebsite.com/mysterymeat.html>

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Links

- Rhetoric of Hypertext:
 - rhetoric of departure:
 - why they should leave and what value is to be gained at the other end
 - rhetoric of arrival:
 - provide information to situate users in the new context, provide value (relative to their point of origin)
- *Rhetoric:*
 - *the art of suasion (persuasion/dissuasion)*
 - *harnessing reason, emotions and authority with a view to persuade an audience and, by persuading, to convince this audience to act, to pass judgement or to identify with given values.*

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Links

- Consider linking strategy
 - how others can link to you?
 - provide support for incoming links:
 - have permanent URLs
 - provide facility to generate URLs for users to embed
 - DOI
 - a permanent identifier given to an electronic document that, in contrast to a URL, is not dependent upon the electronic document's location.
 - e.g., 10.1007/s10067-006-0283-5
 - DOI resolution - free and is provided by <http://dx.doi.org/>
 - DOI publishing - issues (censorship, privacy, lack of uptake), need a registration agency (\$\$)

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Frames

- Why do Frames break the unified model of the Web?
 - The page is (should be) the atomic unit of information
 - it is the “unit of view” and the “unit of navigation”
 - Frames break the atomic unit of information
 - the URL corresponds to the initial state of the frameset
 - the view changes as navigation takes place within the frames
 - the addressing information is no longer a complete specification of the information within the page
 - e.g.,
 - <http://www.w3.org/WAI/wcag-curric/sam91-0.htm>
- Use frames with caution

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Content Design

- The Attention Economy
- Writing for the web
- Page titles
- Online documentation
- Multimedia content
- Response time
- Images, photographs
- Animation
- Video, Audio

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The Attention Economy

- Digital and Traditional Media
 - the ultimate currency is the user’s time/attention
 - what do they look at?
 - where do they remain?
 - where will they return?
 - costs vs benefit tradeoffs
 - costs: “expense” to go elsewhere
 - benefits: what is gained?

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Writing for the Web

- Write succinctly
 - pare down by 50% cf print media
 - reading on-screen cf paper is ~25% slower
- Write for scanability
 - 79% of visitors scan (cf reading word-by-word)
 - short para vs long blocks
 - subheadings, lists (itemized/ enumerations), colour/emphasis
- Restructure
 - devices for structure in traditional writing: headings, paragraph breaks, etc
 - web: hyperlink is also a structuring device
 - use semantic chunks, not page-sized chunks

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Page Titles & Headlines

- The title is important
 - (Perhaps) the only presence for your site
 - (+ first sentence sometimes)
 - Anticipate loss of context
- Tension: unique / meaningful / length
- Afford scanning
 - place content-carrying terms to front
 - consider alphabetization

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Text Legibility

- Attain minimum contrast ratio thresholds
 - positive vs. negative text
 - contrast is the same, reading slighter slower for negative
- Text should stand still
- Justification: left, right, centre?
 - eye should have a consistent starting point

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Font Sizes

- Size of font linked to reading speed, reading performance
 - Fonts smaller than 10-point are linked to slower performance from users
 - Use at least a 10-point font
 - If possible, use at least 12 or 14 point (e.g., aging population)

12 point font Federal health officials are urging healthy people to wait until late November for vaccination. That will allow elderly, pregnant women and people with chronic illnesses such as asthma, heart disease or weak immune systems to receive the first shots now being shipped.

10 point font Federal health officials are urging healthy people to wait until late November for vaccination. That will allow elderly, pregnant women and people with chronic illnesses such as asthma, heart disease or weak immune systems to receive the first shots now being shipped.

8 point font Federal health officials are urging healthy people to wait until late November for vaccination. That will allow elderly, pregnant women and people with chronic illnesses such as asthma, heart disease or weak immune systems to receive the first shots now being shipped.

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Fonts : Serif vs San Serif

- Serifs aid flow, but require adequate resolution

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Animations: Strengths

1. showing continuity in transitions
2. indicating dimensionality in transitions
3. illustrating change over time
4. multiplexing the display
5. enriching graphical representations
6. visualization of three-dimensional structure
7. attracting attention

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Issues with Flash

- Too easy to incorporate gratuitous animation
- Browser's navigation buttons do not work
- Link colours don't work
 - don't distinguish between previously-visited and unvisited links
- Web accessibility features don't work
 - Flash reduces accessibility for users with disabilities
 - E.g., browser functions for enlarging (or reducing) the size of text do not work
- Flash integrates poorly with search

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Graphics

- Principles for use of graphics:
 - Graphics can convey information that can't be effectively accomplished using text
 - photographs
 - video
 - diagrams
 - Graphics can also convey content that can substitute for text
 - Use graphics only when necessary
 - as a supplement to textual content

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Graphics

- Images contribute to latency
 - The more images, the larger the file, the slower the download
- Minimize the size of images
 - restrict single images to 5K
 - restrict page images to 20K
 - provide thumbnail size images
- Which file format to use?
- Produce images in the most appropriate format
 - GIF
 - JPEG
- AJAX - asynchronous javascript and XML

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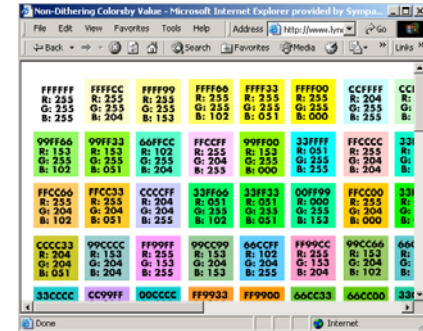
Graphics in Page Design

- GIF format:
 - limited to 256 colors
 - dithered or non-dithered format
- Dithering:
 - a colour-mixing process that is used when a colour is encountered that is not available palette.
 - Palette colours are mixed to approximate the appearance of the desired colour
 - The resulting colour may be grainy or unacceptable
- Non-dithered:
 - the closest palette colour is chosen
 - also may also produced poor results

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Colour Palettes

- Will a graphic in a web page display when viewed from a browser that uses 8-bit colour representations?



<http://www.lynda.com>

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Colour Palettes

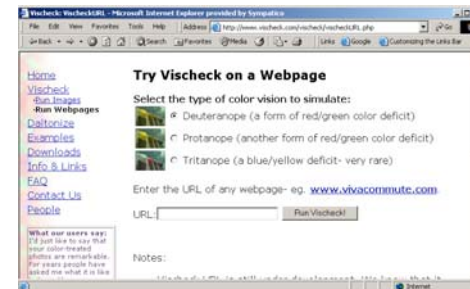
- Select palette of colours carefully
 - Restrain use of many different colours
 - in most cases, use two or three, up to a maximum of four.
 - Foreground and background colours that are close in hue may have insufficient contrast:
 - on monochrome displays
 - for people with certain types of color deficits.
 - <http://www.accesskeys.org/tools/color-contrast.html>

<http://usability.gov/guidelines/accessibility.html#one>

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Colour Palettes

- Test web pages in advance using emulator
 - example: Vischeck, <http://www.vischeck.com>



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Sample Emulations

Seen by people who have normal color vision

HEALTH
■ AIDS
■ aging
■ alternative
■ cancer
■ children
■ diet & fitness
■ men
■ women

Seen by people who cannot see red in colors (protanopia)

HEALTH
■ AIDS
■ aging
■ alternative
■ cancer
■ children
■ diet & fitness
■ men
■ women

Tend to confuse "alternative," "diet & fitness" and "women"

Seen by people who cannot see green in colors (deuteranopia)

HEALTH
■ AIDS
■ aging
■ alternative
■ cancer
■ children
■ diet & fitness
■ men
■ women

Tend to confuse "alternative" and "women"

<http://usability.gov/guidelines/accessibility.html#one>

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Site Design

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Site Design

- Three key features:
 - a directory of the site's main content areas
 - summary of most important information
 - answer the question: what is this site about?
 - a search feature
- Splash screens
 - theory/practice difference:
 - the "theory": set the stage, set the mood, convey information without the distraction of navigation elements
 - in practice: evidence shows that users click off of them as fast as possible; users find them annoying
 - usually wasteful and/or useless

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Deep Linking

- Refers to links whose destinations are other than the entry page (home page)
 - deep links are nothing other than hyperlinking
 - http does not distinguish between deep vs other links
 - practiced by companies, search engines (crawlers)
- Content providers have raised objections to deep linking
 - desire for recognition
 - advertising visibility
 - control of permanently-valid links
- Allow and encourage deep links
 - support various entry points

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Metaphor

- Shopping cart
 - started as a metaphor, now an interface standard
- Geographical/Spatial (ref to eg)

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Navigation

- Web designers need to accommodate and support user-controlled navigation
 - cf Traditional GUI
 - can direct interaction through forcing functions (greyed out menu options, modal dialog boxes, etc)
 - users may follow paths never intended by designer
- Support the following:
 - where am I?
 - where have I been?
 - where do I want to go?
- link to home page on every page to provide context and navigation

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Navigation

- “Breadcrumb” navigation scheme
 - simple, uses minimal space
 - useful only for hierarchical architectures
 - a variant includes breadth as well as depth information
- Tabbed pane design

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Intranet Design

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Intranet Design

- external vs internal audience
- still should follow the basic guidelines, albeit for:
 - a different set of goals,
 - a different set of users,
 - a different set of technical constraints

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Accessibility

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Accessibility

- Sensory/Perceptual disabilities
 - vision, hearing
- Motor disabilities
- Cognitive disabilities

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Accessibility

- Legislated public policy:
 - E.g., USA Federal Government Web sites are required to follow the Section 508 Federal (Web) Accessibility Standards.
- A good idea, not just for those with physical disabilities

Goals

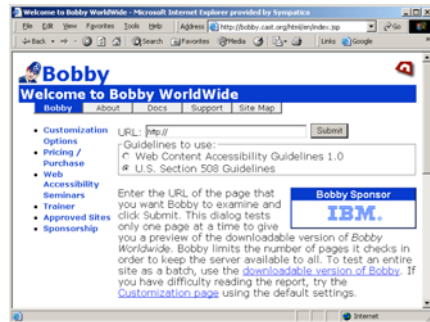
- Device independence
- Text alternatives to graphics and graphic links
- User-controlled content display

<http://www.access-board.gov>

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Accessibility: Evaluation

- Use automated tools:



<http://bobby.cast.org>

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Internationalization

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Issues with Page and Content Design

- Web page content almost always includes text
 - text needs to be translated
 - acronyms and abbreviations are difficult and error-prone to translate
 - avoid use of acronyms and abbreviation
 - the amount of space a text needs depends on the languages
 - how to allocate space?

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Issues with Page and Content Design

- A website may be accessed by users from different language or cultural communities
 - The term internationalization refers to making the web pages usable to multiple communities
- Web page content often includes:
 - dates
 - times
 - currency amounts
 - measurements
 - addresses
 - telephone numbers
- Which format to use?
 - Solution – use “local” format
 - How does one know which locale format to use?

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Translation Expansions

<u>Term</u>	<u>Language</u>
Besturingselement	Dutch
Olvadaci prvek	Czech
Ohjausobjekti	Finnish
Steuerelement	German
Control	English

- May need to allow for additional screen space for other languages

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Guidelines for Space Allocation

Numbers of Characters in Text	Additional Space
Field labels and menu options Up to 10	100-200%
11-20	80-100%
Messages and on-screen instructions 21-30	60-80%
31-50	40-60%
Online help and documentation 51-70	31-40%
Over 70	30%

From National Language Technical Center, IBM (1991)

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