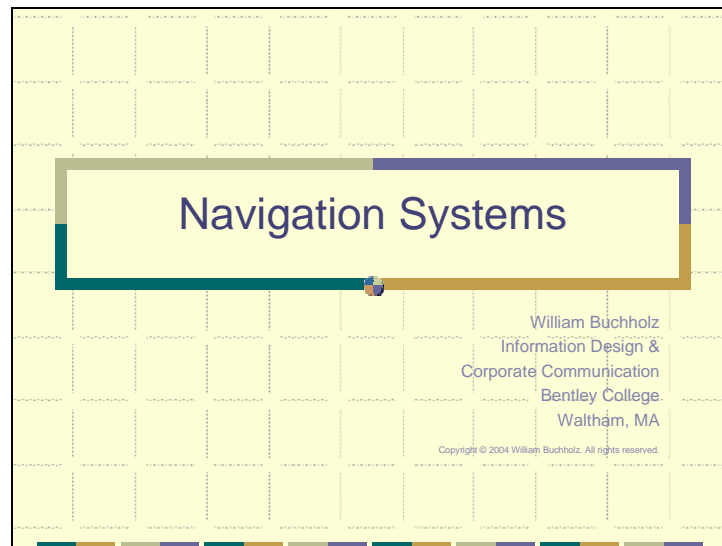


Navigation Systems

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The complete PowerPoint presentation is available as a Web slideshow at
http://cyber.bentley.edu/faculty/wb/presentations/navigation_systems_files/frame.htm



Navigation Systems

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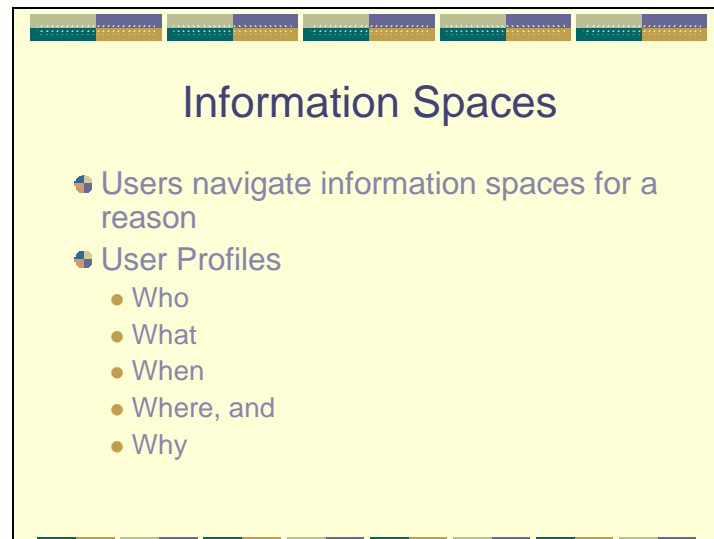
“I once was lost, but now am found.”

John Newton

Amazing Grace, 1779

These lecture slides and notes extend and illustrate Rosenfeld & Morville's *Information Architecture* (chapter 7, pp. 106-131).

Slide 2: Information Spaces



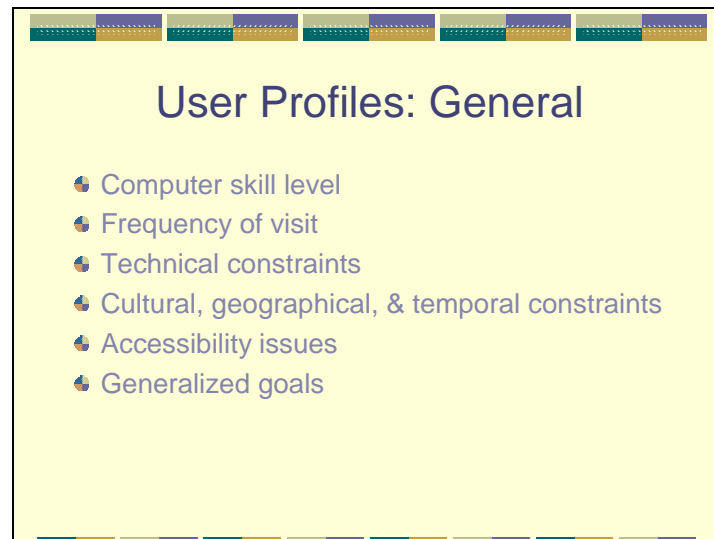
Information Spaces

- Users navigate information spaces for a reason
- User Profiles
 - Who
 - What
 - When
 - Where, and
 - Why

When designing an information space, the architect should always assume user behavior to be purposive – a rational “seeking” of some measurable end. People visit a site to accomplish a goal, to satisfy a need or desire. The usability of site architecture can therefore be defined essentially as “the user’s ability to manipulate the site’s features in order to accomplish a particular goal” (Powell, 2000, p. 10).

In regard to creating successful navigation aids throughout the information space, designers must be intimately familiar with the information (content, services, and applications of the site) and the architecture (the systematic or logical arrangement of the components occupying this space). In addition, they must know *who* their users are and *what* they seek to accomplish in the information space being traversed. Simply put, an information architect must design this space of content and functionality to support users engaged in *purposive traversal*. The users are not aimlessly wandering; they are goal-driven, often relentlessly so.

Slide 3: User Profiles: General



The slide features a yellow background with a decorative border of small colored squares at the top and bottom. The title 'User Profiles: General' is centered at the top in a dark blue font. Below the title, there is a bulleted list of six items, each preceded by a small icon of a person with a gear.

User Profiles: General

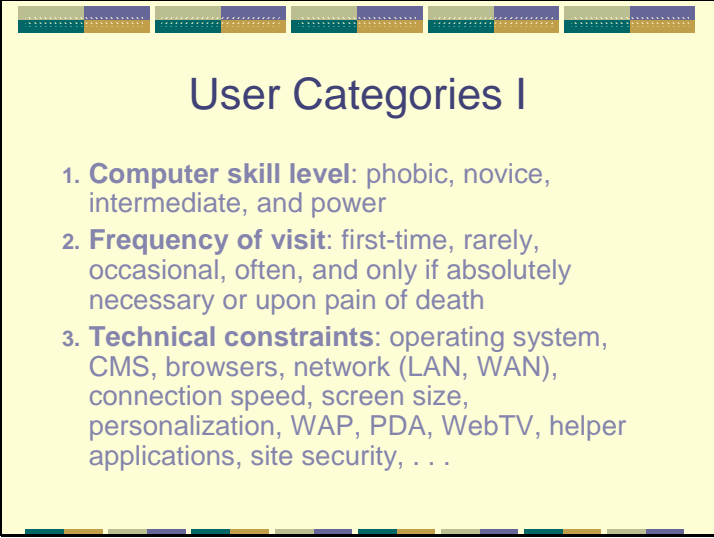
- Computer skill level
- Frequency of visit
- Technical constraints
- Cultural, geographical, & temporal constraints
- Accessibility issues
- Generalized goals

Architects designing information spaces for *purposive traversal* devise their organizational and navigational systems based upon an operational sense of their site users. Design decisions at all levels (from basic content selection, through structures, coding, programming, and aesthetics) are affected by appropriate user categorizations. Users can be categorized (and cross-categorized) in numerous ways; here are just some of the most obvious:

- Computer skill level: phobic, novice, intermediate, and power
- Frequency of visit: first-time, rarely, occasional, often, and only if absolutely necessary or upon pain of death
- Technical constraints: operating system, CMS, browsers, network (LAN, WAN), connection speed, screen size, personalization, WAP, PDA, WebTV, helper applications, site security, . . .
- Cultural, geographical, and temporal constraints: language, social protocols, power/status dynamics, religious beliefs, political systems, widely distributed (global) relationships, . .
- Physical, psychological, intellectual, and accessibility issues: age, gender, politics, education, profession, esteem feelings, . . .
- Generalized goals: business, pleasure, commerce, community, education, . . .

I should emphasize that these categories are not mutually exclusive; they are combinatorial, just as we are all the sum-total of polyhierarchical categorization. Immediate goals and tasks tend to determine category relevance, ascendance, and primacy at any given time.


Slide 4: User Categories I



User Categories I

1. **Computer skill level:** phobic, novice, intermediate, and power
2. **Frequency of visit:** first-time, rarely, occasional, often, and only if absolutely necessary or upon pain of death
3. **Technical constraints:** operating system, CMS, browsers, network (LAN, WAN), connection speed, screen size, personalization, WAP, PDA, WebTV, helper applications, site security, . . .

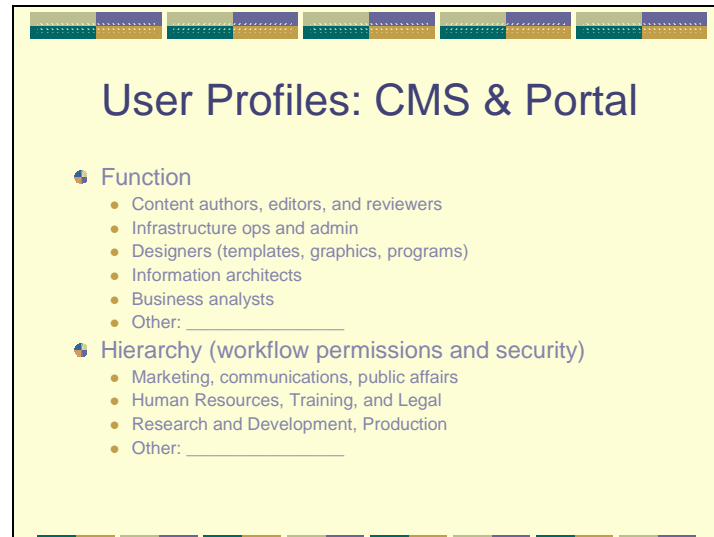
Slide 5: User Categories II



User Categories II

4. **Cultural, geographical, and temporal constraints:** language, social protocols, power/status dynamics, religious beliefs, political systems, widely distributed (global) relationships, . . .
5. **Physical, psychological, intellectual, and accessibility issues:** age, gender, politics, education, profession, esteem feelings, . . .
6. **Generalized goals:** business, pleasure, commerce, community, education, . . .

Slide 6: User Profiles: CMS & Portal



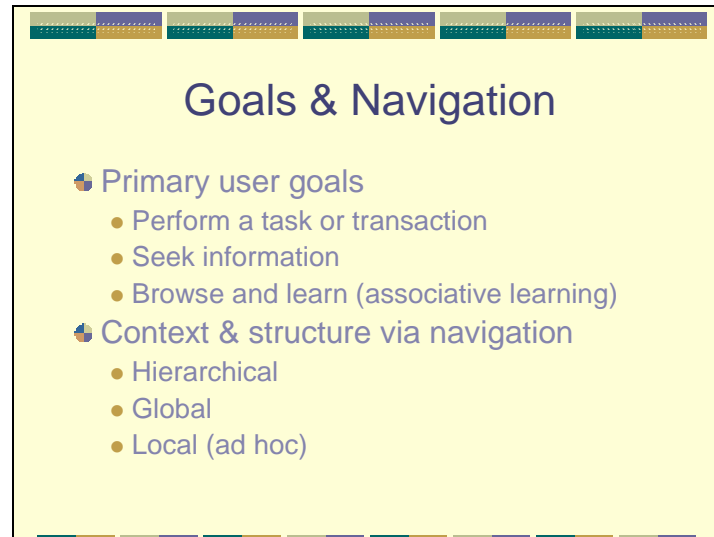
User Profiles: CMS & Portal

- Function
 - Content authors, editors, and reviewers
 - Infrastructure ops and admin
 - Designers (templates, graphics, programs)
 - Information architects
 - Business analysts
 - Other: _____
- Hierarchy (workflow permissions and security)
 - Marketing, communications, public affairs
 - Human Resources, Training, and Legal
 - Research and Development, Production
 - Other: _____

User profiles can be further refined depending upon infrastructure and organizational objectives and constraints. For example, in any distributed information system, particularly in a corporate portal or Content Management System (CMS), it is imperative that “the right content” be delivered “to the right audience” (Boiko, 2002, p. 153).

What each user sees, where and how each user can navigate, the kind of operations that can be performed on the content, the sequence of performance, and the disposition of modified content – all is determined by the workflow, personalization, and business rules that control the harvesting and organization (p. 131) of the site’s content (its information and functionality). Navigation, as *purposive traversal*, becomes a function of these processes and their constraints.

Slide 7: Goals & Navigation



Goals & Navigation

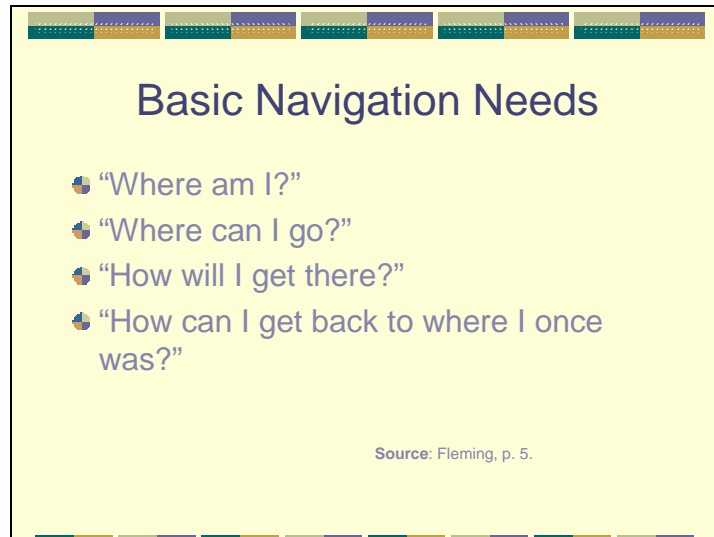
- Primary user goals
 - Perform a task or transaction
 - Seek information
 - Browse and learn (associative learning)
- Context & structure via navigation
 - Hierarchical
 - Global
 - Local (ad hoc)

Based upon user profile considerations, an information architect's content structuring and navigation system decisions should be determined by a clear – as clear as possible – understanding of the multiple categories of user goals, constrained by the system rules and infrastructure imperatives. In fact, the ISO 13407 standard (Human-Centered Design Processes for Interactive Systems) insists that users be considered in this context. The entire user experience, according to the ISO standard, should be satisfying, allowing them to achieve their goals with as little frustration as possible. (If you wish to purchase the 26-page ISO 13407 document, visit

<http://www.iso.ch/iso/en/CatalogueDetailPage.CatalogueDetail?CSNUMBER=21197>)

Applying this ISO standard to navigation, Thomas Powell (2000, p. 14) notes that “as long as users feel they are making their way to an end result in a satisfactory fashion, the navigation is appropriate.” Jennifer Fleming (1998, p. 11) reminds designers and information architects that “rather than designing sidebars and menus,” they are “designing spaces and interactions. In short, . . . [they are] crafting the user experience.” In sum, this experience is most satisfying if sites are designed carefully upon a structure of content categories that reflect typical and significant user tasks and behaviors.

Slide 8: Basic Navigation Needs

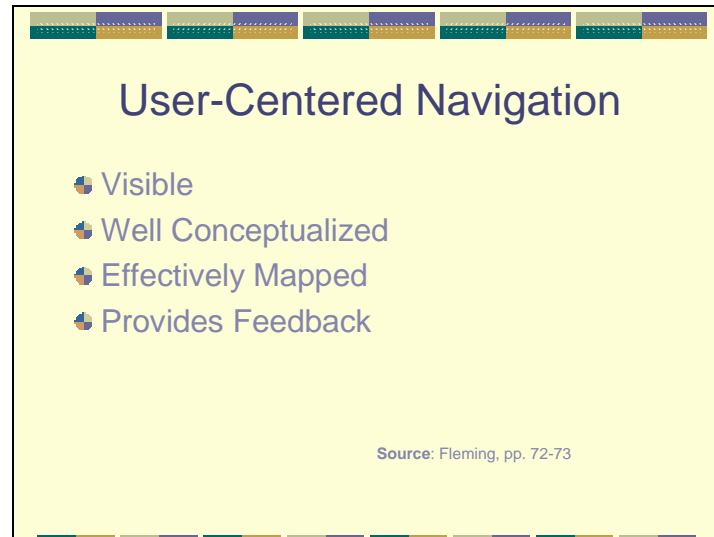


Basic Navigation Needs

- “Where am I?”
- “Where can I go?”
- “How will I get there?”
- “How can I get back to where I once was?”

Source: Fleming, p. 5.

Slide 9: User-Centered Navigation



User-Centered Navigation

- Visible
- Well Conceptualized
- Effectively Mapped
- Provides Feedback

Source: Fleming, pp. 72-73

In setting out the four main components of user-centered navigation on the Web, Jennifer Fleming (1998, pp. 72-73) has adopted and compressed Donald Norman's seven stages of task completion (*The Design of Everyday Things*, Doubleday, 1990). Her actual breakdown is this:

- *“Visibility.* By looking, the user can tell the state of the device and the alternatives for action.
- *A good conceptual model.* The designer provides a good conceptual model for the user, with consistency in the presentation of operations and results and coherent, consistent system image.
- *Good mappings.* It is possible to determine the relationships between actions and results, between the controls and their effects, and between the system state and what is visible.
- *Feedback.* The user receives full and continuous feedback about the results of actions.”

Slide 10: Link Classification

Link Classification

“Semantic by nature and rhetorical by purpose” ... Harrison (2002)

- Authorizing
- Commenting
- Enhancing
- Exemplifying
- Mode-Changing
- Referencing
- Self-selecting


Harrison (2002, October) provides this introduction and tabular discussion of her classification scheme for links:

“The Classification of Links

The classification of links describes a link's functionality as intended rhetorically by the author but with recognition that the user will be the final arbiter of its semantic value. This classification applies to all types of links, including the full panoply of multimedia. As long as a link connects two items of information, e.g., text to text, text to a song, a graphic to animation, it creates a relationship that is semantic by nature and rhetorical by purpose. The link categories in Table 1 and the descriptions that follow are in alphabetical order. It is important to note that a site can have one or more types of links, and a link can have one or more functions. (This section is adapted from Hammerich and Harrison, 2002, pp. 185-191.)”


http://www.firstmonday.dk/issues/issue7_10/harrison/

Slide 11: A Classification of Links According to Primary Function




A Classification of Links According to Primary Function

Link	Primary Function	Examples
Authorizing	Describes an organization's legal, formal policies, contact information, etc. that authenticate the site and its content.	About Us Customer Service Policies
Commenting	Provides opinion about the site and/or its content.	Press Releases Testimonials
Enhancing	Provides more factual information about site content by offering greater detail or painting the "bigger picture."	Guidelines for Membership Site Map




Slide 12: A Classification of Links According to Primary Function

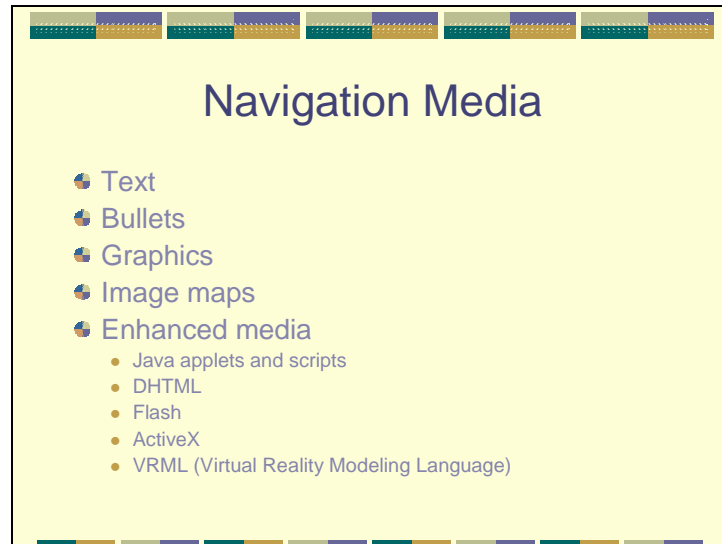


A Classification of Links According to Primary Function

Link	Primary Function	Examples
Exemplifying	Provides a specific example of content within a broader category.	Future Events Today's Horoscopes
Mode-Changing	Moves users from the reading mode to one that requires a different kind of activity.	Online Survey Shopping Cart
Referencing/Citing	Provides information that "informs" or supplements the site's content.	Bibliography Related Links
Self-Selecting	Allows users to narrow a search by making choices based on their age, sex, geographical location, life situation, personal interests, and so on.	For Seniors Only Your Local Chapter



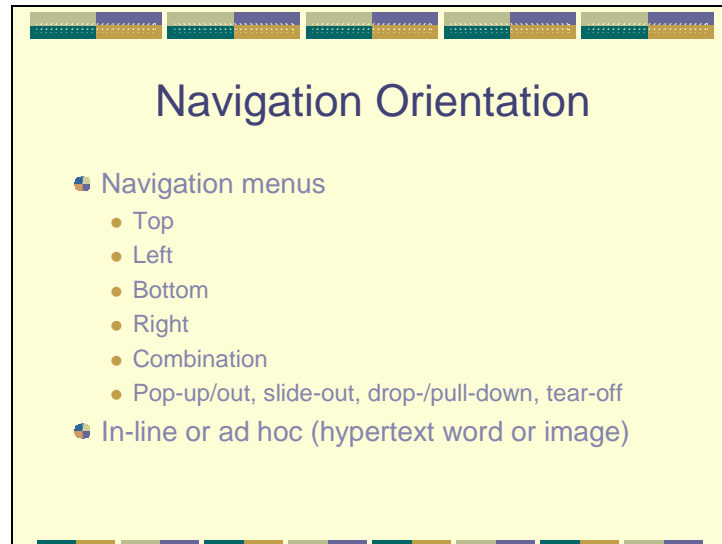
Slide 13: Navigation Media



Plain and simple text is probably the most common (and by far the best) form of navigation. For example, people feel confident that in clicking on text that says HELP, they will be taken to a page that offers them help. While a cute graphic of an extended hand waving about could also signal help, some visitors may not understand your icon or may interpret the wave as something other than an offer of help. To avoid any possible confusion, therefore, stick with text – or add text to your navigational icons. You are always safe using meaningful text as your principal navigation medium. Avoid mystery-meat navigation.

While some of the eye-catching effects that can be achieved dynamically on a page using Java applets, JavaScripts, Flash, or active X components may seem desirable, remember that they can cause visitors real trouble. Thomas Powell (2000, p. 18) reminds us that “the focus should not be on the GUI widgets – they are just interface. The focus should be on the content and task at hand. Far too often, however, designers attempt to build memorability for their site by making the interface unusual.” Keeping in mind our architectural metaphor, Jennifer Fleming (1998, p. 63) notes that “the happy marriage of architecture and interface – of logical structure and visual meaning – creates a cohesive user experience.” Thus, the true determinants of navigation interface effectiveness are the site’s users engaging in *purposive traversal*.

Slide 14: Navigation Orientation

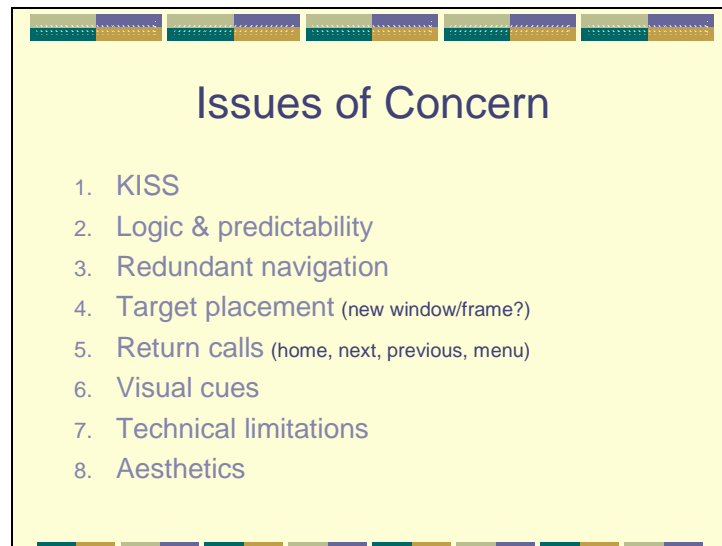


The most obvious places for navigation media are the top and the left positions of your screen. You can always be sure that people will look there first for aids in moving through your site. In recent years, people have also become accustomed to the bottom of a page as a potential location for global navigation bars. It is often a good idea, in fact, to have on every page of your site a text-based global navigation bar that leads to the site's main pages (home page and second-level categories). Such global navigation bars are commonly found on the top and/or bottom of the page. Very few sites use the right-hand side of the page for navigation.

In-line navigation consists of hyperlinks that appear in bodies of text. When the hyperlink is in text form, the usual convention is to have these underlined in blue; they turn red when clicked, maroon or purple when visited. Though you can eliminate underlines and change hyperlink colors, I would recommend your sticking to the underline and color convention. You can never go wrong doing so. Be very careful to phrase your hyperlinks meaningfully and concisely. Avoid click here.

Hyperlinked images should employ the ALT tag and usually should indicate visibly that they are a link (bordered hyperlink). Plan your page so that people browsing your site can navigate with their images off and JavaScript disabled. Remember, you are always safe in all browsers with simple HTML navigation.

Slide 15: Issues of Concern



- Keep your navigational aids as simple and logical as possible. You never want to create a situation where it is likely that the navigational aids will malfunction. Visual and technical complexity introduce greater likelihood of navigational failure.
- Your visitors will thrive on being able accurately to predict where your navigational aids are and how they work. Don't make them think. Make them feel comfortable and at home. Once you settle on the page/site design, do not make changes lightly. Remember, as a rule, people hate uncertainty and change.
- Do not be afraid of redundancy. Navigational aids top and bottom cannot hurt. As Jakob Nielsen points out, however, you don't need to have every page link to every other page on your site ("Is Navigation Useful?" <http://www.useit.com/alertbox/20000109.html>). You should, however, provide clear links to the level above the current page. (Tip: never have a page actively linked to itself.)

You might also consider employing a left-hand frame for your page menu. With a left-hand frame-menu, topics are always before the visitor's eyes for review and selection. You probably should make sure that your menu frame takes up no more than 25% of the screen real estate. Weigh carefully the decision to use frames; remember, some people hate them with a passion. And

with frames, there is always the danger of orphan pages being churned up by search engines. Thus, always make sure that every page on your site has, at minimum, a link to the home page or at page-bottom a text-based global navigation bar.

- As a rule, do not have links open in new windows, for this then breaks the functionality of the browser “back” button and may eventually open a proliferation of browser windows. Some people aren’t even aware this is happening until their overburdened computer crashes. If for some reason you need to open a link in a new window, inform your visitors (also see Jakob Nielsen, “The Top Ten New Mistakes of Web Design,” <http://www.useit.com/alertbox/990530.html>).
- Take advantage of the browser “back/forward” buttons. Most people, when in navigational hot water, instinctively go to these for help (also see Jakob Nielsen, “The Top Ten New Mistakes of Web Design,” <http://www.useit.com/alertbox/990530.html>). Be very careful what you add to your page. Do you see the dangers in using “next” and “previous”? What does “home” mean? Think through these apparently “clear” navigational aids.
- Keep in mind that good navigational systems offer visual cues to your visitors. When the mouse is over a link, or when it is clicked or released, something should happen: usually shape or color-changes signal that a navigational process is under way. Good information architects and Web designers also take advantage of the title attribute; links can give another layer of information through a tool tip. Don’t get overly clever, however, in establishing visual cues. A site laden with Java applets may look cool in a Pentium IV, 1.7GHz machine with a 17” monitor being fed through a wide band. But most of your visitors won’t have that luxury.
- Envision your visitors connecting to you via a 28.8K or 56K modem feeding into a 486, a Pentium 1, or a 3-year-old laptop, and you’ll be safe. Most monitors will be set to a resolution of 800 X 600 or 1024 X 768. Do not use Flash as core navigation without some kind of HTML backup. Also try to avoid any navigational feature that forces visitors to download plugins. People either hate – or are afraid – to download extraneous programs.
- Test your tricky navigational devices in I.E. and Netscape, 3.0 and up – lower if you determine that your visitors have old browsers. Remember, the coolest dynamic pages don’t look cool at all when they just lay there dead. As far as

information architecture is concerned, it is always wise to sacrifice surface beauty for functionality.


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