

7

Navigation

Navigation refers to the method used to find

information within a Web site. A navigation page is used primarily to help users locate and link to destination pages. A Web site's navigation scheme and features should allow users to find and access information effectively and efficiently. When possible, this means designers should keep navigation-only pages short. Designers should include site maps, and provide effective feedback on the user's location within the site.

To facilitate navigation, designers should differentiate and group navigation elements and use appropriate menu types. It is also important to use descriptive tab labels, provide a clickable list of page contents on long pages, and add 'glosses' where they will help users select the correct link. In well-designed sites, users do not get trapped in dead-end pages.

7:1 Provide Navigational Options

Guideline: Do not create or direct users into pages that have no navigational options.

Relative Importance:

1 2 3 4 0

Strength of Evidence:

1 2 0 0 0

Comments: Many Web pages contain links that open new browser windows. When these browser windows open, the Back button is disabled (in essence, the new browser window knows nothing of the user's past navigation, and thus is disabled). If the new window opens full-screen, users may not realize that they have been redirected to another window, and may become frustrated because they cannot press Back to return to the previous page. If such links are incorporated into a Web site, the newly-opened window should contain a prominent action control that will close the window and return the user to the original browser window.

In addition, designers should not create Web pages that disable the browser's Back button. Disabling the Back button can result in confusion and frustration for users, and drastically inhibits their navigation.

Sources: Detweiler and Omanson, 1996; Lynch and Horton, 2002; Spool, et al., 1997; Tullis, 2001; Zimmerman, Slater and Kendall, 2001.

Example:

The screenshot shows a web browser window with a document open. The document contains a list of links and a section titled "Work in progress". The "Back" button in the browser's navigation bar is disabled, indicated by a red circle and a red arrow pointing to it. The document content includes the following text:

published in *Shakespeare Quarterly*, Autumn, 1986. ([Q1LEAR PERFORM](#))

- Schneider, Ben Ross. "Granville's Jew of Venice (1701): A Class Reading of Shakespeare's Merchant" ([GRANVILLE](#))
- ... *Shakespeare's Morality* (a work in progress in five chapters)
 - Chapter One: "Shakespeare was a Stoic" ([MORAL_SHAKES-1](#))
 - Chapter Two: "Shylock Is Us" ([MORAL_SHAKES-2](#));
 - Chapter Three: "King Lear and the Culture of Justice" ([MORAL_SHAKES-3](#));
 - Chapter Four: "Henry IV, 1 & 2: The Education of a Prince" ([MORAL_SHAKES-4](#));
 - Chapter Five: "Hal Imitates The Sun" ([MORAL_SHAKES-5](#))
- Shand, G.B. Skip. "Queen of the First Quarter." Performance-Abstract: [SHAND ABSTRACT](#); Paper: [HAM/ETQ1 QUEEN](#)
- Steele, Kenneth B. "Vowing, Swearing, and Superpraising of delivered at the 14th Annual Patristic, Medieval and Renaissance ([PETRARCH PYRAMUS](#))
- ... "This Falls Out Better Than I Could Devise": Play-bound expanded version of a paper contributed to the ludic element ([SURROGAT PLAYWRIT](#))
- ... "Leadon Contemplation": Ambiguous Evidence of Revision duplication in Q1 LLL. Abstract: [STEELE ABSTRACT](#); Paper: [LLL-Q1 REVISION](#)
- ... "The Letter was not Nipe but Full of Charge": Towards a ...

Work in progress

Chapter 2 of Shakespeare's Morals: Shylock

Our approach to *The Merchant of Venice* has been conditioned by our attitude toward victims of all sorts. We cannot see that there are two sides to the question of humiliation. Because he is a Jew, and subject to extreme well, we cannot abide the notion that he might deserve our view of the play is ethnocentric in the extreme as the view of the Presbyterian missionaries who called the honest nakedness of Polynesian women in Mother Hubbard something similar has happened to the honest Christian Merchant of Venice.

The link for this document opens a new browser window that presents the user with a disabled Back button. This can confuse users.

7:2 Differentiate and Group Navigation Elements

Guideline: Clearly differentiate navigation elements from one another, but group and place them in a consistent and easy to find place on each page.

Relative Importance:

1 2 3 4 ○

Strength of Evidence:

1 2 3 ○ ○

Comments: Create a common, Web site-wide navigational scheme to help users learn and understand the structure of your Web site. Use the same navigation scheme on all pages by consistently locating tabs, headings, lists, search, site map, etc. Locate critical navigation elements in places that will suggest clickability (e.g., lists of words in the left or right panels are generally assumed to be links).

Make navigational elements different enough from one another so that users will be able to understand the difference in their meaning and destination. Grouping reduces the amount of time that users need to locate and identify navigation elements.

Do not make users infer the label by studying a few items in the group. Finally, make it easy for users to move from label to label (link to link) with a single eye movement. This best can be done by positioning relevant options close together and to using vertical lists.

Sources: Bailey, 2000b; Detweiler and Omanson, 1996; Evans, 1998; Farkas and Farkas, 2000; Hornof and Halverson, 2003; Koyani and Nall, 1999; Lynch and Horton, 2002; Nielsen and Tahir, 2002; Niemela and Saarinen, 2000.

Example:

Navigation elements are grouped (high-level topic areas across the top of the page) and consistently placed across the Web site.

The example shows three overlapping screenshots of the CIA website. Each screenshot features a consistent navigation structure. At the top of each page is a header with the CIA logo and the slogan "THE WORK OF A NATION. THE CENTER OF INTELLIGENCE." Below this is a secondary navigation bar with links for "CIA Home", "Privacy", "Printable Text Version", and "What Do You Think of Our Site?". A prominent navigation menu is located below the header, containing five items: "Life at the CIA", "Student Opportunities", "How to Apply", "Career FAQs", and "View All Positions". This menu is highlighted with a red circle in all three screenshots. On the left side of the page, there is a vertical sidebar menu with various categories, also highlighted with a red circle. The main content area of the page shows different sections, such as "Military to CIA", which is also highlighted with a red circle. The bottom of the page includes a "RETURN TO TOP" button and a footer with the date "Updated: Thu Apr 27 2006 14:48:02" and a secondary navigation bar with links for "Careers Home", "CIA Home", "Privacy", "Printable Text Version", and "Career Opportunities Flash".

7:3 Use a Clickable 'List of Contents' on Long Pages

Guideline: On long pages, provide a 'list of contents' with links that take users to the corresponding content farther down the page.

Relative Importance:

12340

Strength of Evidence:

12300

Comments: For long pages with several distinct sections that are not visible from the first screenful, add a short, clickable list of the sections (sometimes called 'anchor' or 'within-page' links) at the top of the page. 'Anchor links' can serve two purposes: they provide an outline of the page so users can quickly determine if it contains the desired information, and they allow users to quickly navigate to specific information.

Since 'anchor links' enable a direct link to content below the first screenful, they are also useful for getting users to specific information quickly when they arrive from a completely different page.

Sources: Bieber, 1997; Farkas and Farkas, 2000; Haas and Grams, 1998; Levine, 1996; Nall, Koyani and Lafond, 2001; Spool, et al., 1997; Spyridakis, 2000; Williams, 2000; Zimmerman, Slater and Kendall, 2001.

Example:

Contents

- [Abstract](#)
- [Executive Summary](#)
- [Introduction](#)
- [Uses and Benefits of Technology Roadmapping](#)
- [What is Technology Roadmapping?](#)
- [What is a Technology Roadmap?](#)
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- [Knowledge and Skills Required for Technology Roadmapping](#)
- [Technology Roadmapping Process](#)

What is Technology Roadmapping?
Technology roadmapping is a needs-driven technology planning process to help select, and develop, technology alternatives to satisfy a set of product needs. It brings together a team of experts to develop a framework for organizing and presenting technology-planning information to make the appropriate technology investment decisions to leverage those investments. (For an example of this teaming process at the industry level, see Garcia, Introduction to Technology Roadmapping: The Semiconductor Industry Association's Technology Roadmapping Process.)

Given a set of needs, the technology roadmapping process provides a way to develop, organize, and present information about the critical system requirements and performance targets that must be satisfied by certain time frames. It also identifies technologies to be developed to meet those targets. Finally, it provides the information needed to make trade-offs among different technology alternatives.

Roadmapping can be done at either of two levels - industry or corporate. These levels have different commitments in terms of time, cost, level of effort, and complexity. However, at both levels the resulting roadmaps have the same structure - needs, critical system requirements and targets, technology areas, technology drivers and targets, technology alternatives and recommended alternatives or paths, and a roadmap report - although with different levels of detail. Technology roadmapping within a national laboratory is essentially corporate roadmapping, although a national laboratory may participate in an industry roadmapping process.
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What is a Technology Roadmap?
A technology roadmap is the document that is generated by the technology roadmapping process. It identifies (for a set of product needs) the critical system requirements, the process performance targets, and the technology alternatives and milestones to meet those targets. In effect, a technology roadmap identifies alternate technology "roads" to meet certain performance objectives. A single path may be selected, and a plan of action developed. If there is high uncertainty or risk, then multiple paths may be selected and pursued concurrently. The roadmap identifies precise objectives and helps focus resources on critical technologies that are needed to meet those objectives. This focusing is important because it allows increasingly limited R&D investments to be used more effectively.
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Types of Technology Roadmaps
There are different types of technology roadmaps. The product technology roadmap is usually referred to simply as a technology roadmap.

Another type of technology roadmap, which is used by some corporations, is an emerging technology roadmap. An emerging technology roadmap differs from a product technology roadmap in two ways:

See page xxii
for detailed descriptions
of the rating scales

12340

7:4 Provide Feedback on Users' Location

Guideline: Provide feedback to let users know where they are in the Web site.

Comments: Feedback provides users with the information they need to understand where they are within the Web site, and for proceeding to the next activity. Examples of feedback include providing path and hierarchy information (i.e., 'breadcrumbs'), matching link text to the destination page's heading, and creating URLs that relate to the user's location on the site. Other forms of feedback include changing the color of a link that has been clicked (suggesting that destination has been visited), and using other visual cues to indicate the active portion of the screen.

Sources: Evans, 1998; Farkas and Farkas, 2000; IBM, 1999; Lynch and Horton, 2002; Marchionini, 1995; Nielsen and Tahir, 2002; Spool, et al., 1997.

Example:

Relative Importance:
 1 2 3 4 0

Strength of Evidence:
 1 2 0 0 0

Color coding the pages and navigation menus provides effective feedback to the user about their location in the Web site.

This box is used to designate the section of the Web site that is currently being viewed.

Personal

- > Home
- > APPLY NOW
- Online Statements
- > Login
- > Learn More
- > Billing/Payment Inquiry
- Learn About the Card
 - > Cardmember Benefits
- Take Advantage of
 - > Restaurant Savings Program
 - > Special Promotions
- Find it Fast
 - > Merchant Locations
 - > ATMs and Cash
- More Card Options
 - > Restaurant Savings Program Card
 - > Special Promotions

> Corporate

> Merchants

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ESI Introduces Course Packs

Navigation Menu:

- home
- new media
- training
- staffing
- publications
- esi press@
- online training
- hire
- home
- new media
- training
- staffing
- publications
- esi press@
- online training
- about training
- classes
- course registration
- certificate programs
- training vouchers
- custom and on-site training
- partners
- current specials
- locations
- faq's
- clients
- jobs
- order a temp
- employees
- applicants
- quote
- locations
- gsa schedule information

7:5 Place Primary Navigation Menus in the Left Panel

Guideline: Place the primary navigation menus in the left panel, and the secondary and tertiary menus together.

Relative Importance:

1 2 3 4 0

Strength of Evidence:

1 2 3 0 0

Comments: One study found that navigation times were faster when the primary menu was located in the left panel. Also, navigation performance was best when the secondary and tertiary menus were placed together. Placing a navigation menu in the right panel was supported as a viable design option by both performance and preference measures. Users preferred having the primary menu in the left panel, and grouping secondary and tertiary menus together, or grouping all three menu levels together. The best performance and preference was achieved when all three menus were placed in the left panel (placing them all in the right panel achieved close to the same performance level).

Sources: Kalbach and Bosenick, 2003; Kingsburg and Andre, 2004.

Example:

The screenshot displays the website for the Chief Financial Officers Council (CFO Council). The primary navigation menu is located in the left panel, listing: Home, CFO Council, About CFCO, Members Only, Calendar, Initiatives, Links, Documents, BOAC, and FAQ. The secondary and tertiary navigation menus are located in the right panel, listing: Home, CFO Council (with a dropdown arrow), Members, Committees, Five Year Plan, Minutes, About CFCO, Members Only, Calendar, Initiatives, Links, Documents, BOAC, and FAQ. The main content area features a search bar, a welcome message, and an OMB Memo to Agency CIO's and CAO's.

Primary and secondary navigation is placed consistently throughout the site.

7:6 Use Descriptive Tab Labels

Relative Importance:

12300

Strength of Evidence:

12300

Guideline: Ensure that tab labels are clearly descriptive of their function or destination.

Comments: Users like tabs when they have labels that are descriptive enough to allow error-free selections. When tab labels cannot be made clear because of the lack of space, do not use tabs.

Sources: Allinson and Hammond, 1999; Badre, 2002; Koyani, 2001b.

Example:

These tab labels clearly describe the types of information a user can expect to find on the destination pages.



These tab labels are not as descriptive which leaves the user in doubt about the type of information available on the destination pages.



7:7 Present Tabs Effectively

Guideline: Ensure that navigation tabs are located at the top of the page, and look like clickable versions of real-world tabs.

Relative Importance:

12300

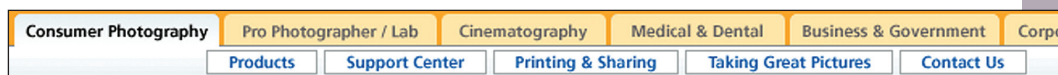
Strength of Evidence:

12300

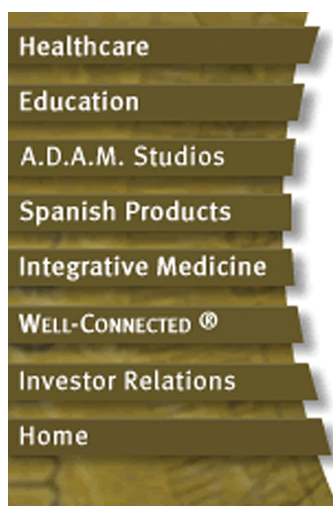
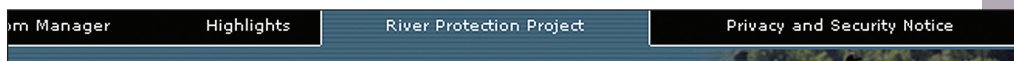
Comments: Users can be confused about the use of tabs when they do not look like real-world tabs. Real-world tabs are those that resemble the ones found in a file drawer. One study showed that users are more likely to find and click appropriately on tabs that look like real-world tabs.

Sources: Bailey, Koyani and Nall, 2000; Kim, 1998.

Example: These clickable tabs look just like tabs found in office filing cabinets.



The design of these navigation tabs provides few clues to suggest that they are clickable until a user mouses-over them. Mousing-over is a slow and inefficient way for users to discover navigation elements.



7:8 Keep Navigation-Only Pages Short

Relative Importance:

1 2 3 4

Strength of Evidence:

1 2 3 4

Guideline: Do not require users to scroll purely navigational pages.

Comments: Ideally, navigation-only pages should contain no more than one screenful of information. Users should not need to scroll the page, even a small distance. One study showed that users considered the bottom of one screenful as the end of a page, and they did not scroll further to find additional navigational options.

Sources: Piolat, Roussey and Thunin, 1998; Schwarz, Beldie and Pastoor, 1983; Zaphiris, 2000.

Example: Users can view all of the information on these navigation pages without scrolling.

The image displays two screenshots of the Idaho.gov website, illustrating navigation-only pages. The top screenshot shows the 'Tourism & Transportation' page, which features a navigation menu on the left with categories like 'About Idaho', 'Business', 'Education', 'Jobs & Labor', 'Government', 'Health & Family', 'Laws & Rules', and 'Tourism & Transportation'. Below the menu is a 'Contents' section with links to 'Art, Culture & Entertainment', 'Counties & Cities', 'Maps', 'Natural Resources', 'Outdoor Recreation', 'Trucking Idaho.gov', 'Vehicles & Transport', 'Visiting Idaho', and 'Weather'. A 'Federal Resources' section is also present. The bottom screenshot shows the 'Business' page, which has a similar navigation menu and a 'Contents' section with links to 'business.idaho.gov', 'Starting a Business', 'Running a Business', 'Relocating a Business', 'Closing a Business', 'Professional Licenses', and 'Online Services for Business'. It also includes a 'Federal Resources' section with links to 'Business.gov', 'FirstGov.gov Business Section', and 'SBA.gov'. Both screenshots include a top navigation bar with 'HOME', 'AGENCY INDEX', 'ONLINE SERVICES', and 'SEARCH & HELP'.

7:9 Use Appropriate Menu Types

Guideline: Use 'sequential' menus for simple forward-moving tasks, and use 'simultaneous' menus for tasks that would otherwise require numerous uses of the Back button.

Relative Importance:

1 2 0 0 0

Strength of Evidence:

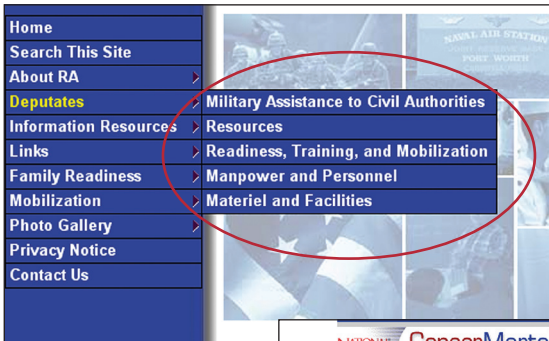
1 2 3 4 0

Comments: Most Web sites use familiar 'sequential' menus that require items to be selected from a series of menus in some predetermined order. After each selection is made, another menu opens. The final choice is constrained by the sum total of all previous choices.

Simultaneous menus display choices from multiple levels in the menu hierarchy, providing users with the ability to make choices from the menu in any order. Simultaneous menus are often presented in frames, and are best employed in situations where users would have to make extensive use of the Back button if presented with a sequential menu.

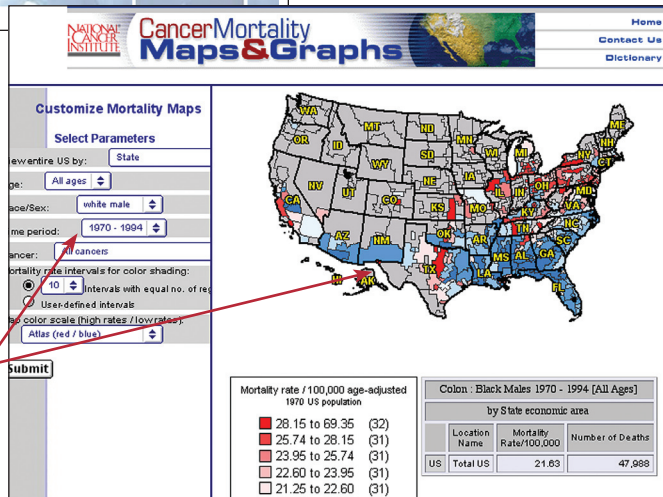
Sources: Card, Moran and Newell, 1980a; Hochheiser and Shneiderman, 2000.

Example:



This is an example of a 'sequential' menu. In this case, mousing-over 'Deputates' invokes the circled sub-menu.

This is a good example of when to use 'simultaneous' menus. The user can repetitively manipulate the many variables shown in the left panel and view the results on the map in the right panel without having to use the Back button.



7:10 Use Site Maps

Guideline: Use site maps for Web sites that have many pages.

Comments: Site maps provide an overview of the Web site. They may display the hierarchy of the Web site, may be designed to resemble a traditional table of contents, or may be a simple index.

Some studies suggest that site maps do not necessarily improve users' mental representations of a Web site. Also, one study reported that if a site map does not reflect users' (or the domain's) conceptual structure, then the utility of the map is lessened.

Sources: Ashworth and Hamilton, 1997; Billingsley, 1982; Detweiler and Omanson, 1996; Dias and Sousa, 1997; Farkas and Farkas, 2000; Farris, Jones and Elgin, 2001; Kandogan and Shneiderman, 1997; Kim and Hirtle, 1995; McDonald and Stevenson, 1998; McEaney, 2001; Nielsen, 1996a; Nielsen, 1997a; Nielsen, 1999b; Nielsen, 1999c; Nielsen, 1999d; Stanton, Taylor and Tweedie, 1992; Tullis, 2001; Utting and Yankelovich, 1989.

Example:



This site map effectively presents the site's information hierarchy.

The use of headers, subcategories, and alphabetization make this site map easy to scan.

Relative Importance:

1 2 3 4

Strength of Evidence:

1 2 3 4

Product reviews

MEJT Labs

MEJT Reviews

Hardware

- Desktops
- Graphics & Sound
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- Monitors
- Networking
- Notebooks
- Printers
- Scanners
- Storage

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- Cell phones
- Digital cameras
- Gadgets
- Handhelds
- Home video
- Home audio
- Portable music

Software

- Graphics & publishing
- Internet applications
- Music & video
- Operating systems
- Productivity & reference
- Security & utilities

Internet Services

- Access
- Development
- Hosting

Internet Services

Gift Guides

7:11 Use 'Glosses' to Assist Navigation

Guideline: Provide 'glosses' to help users select correct links.

Comments: 'Glosses' are short phrases of information that popup when a user places his or her mouse pointer close to a link. It provides a preview to information behind a link. Users prefer the preview information to be located close to the link, but not placed such that it disturbs the primary text. However, designers should not rely on the 'gloss' to compensate for poorly labeled links.

Relative Importance:



Strength of Evidence:



Sources: Evans, 1998; Farkas and Farkas, 2000; Zellweger, Regli and Mackinlay, 2000.

Example:



When a user places his or her mouse pointer over one of these links ('News', 'Information', etc.), a 'gloss' appears to the right that provides information about the content contained under that particular link.

When a user mouses-over the 'Office of Trust Records (OTR)' link, the circled text appears.



See page xxii for detailed descriptions of the rating scales
1 2 3 4 0

7:12 Breadcrumb Navigation

Relative Importance:

1 ○ ○ ○ ○ ○

Strength of Evidence:

123 ○ ○

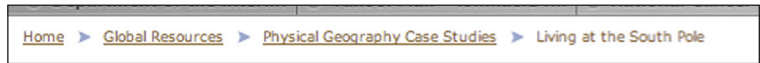
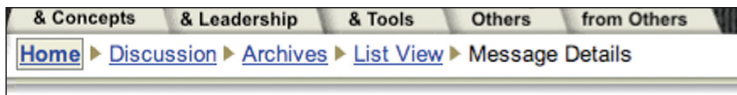
Guideline: Do not expect users to use breadcrumbs effectively.

Comments: One study reported no difference in task completion times and total pages visited between groups that had breadcrumbs and those that did not. Participants could have used breadcrumbs thirty-two percent of the time, but only did so six percent of the time. It is probably not worth the effort to include breadcrumbs unless you can show that your Web site's users use them frequently, either to navigate the site, or to understand the site's hierarchy.

One study found that test participants who received instruction on the use of breadcrumbs completed tasks much faster than those who did not. This time savings could result in increased productivity for users that search Web sites on a daily basis.

Sources: Rogers and Chaparro, 2003; Hull, 2004.

Example: Breadcrumbs, when used, allow users to quickly navigate your site.



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