Web Design Guidelines

Welcome to the IBM Ease of Use Group's guidelines for creating easy-to-use Web interfaces. Achieving ease of use is essential for any site competing for business on the Web. The competition is only a couple of clicks away, and if users become dissatisfied, they can simply go elsewhere. However, by following these guidelines and using a user-centered design process, businesses can retain current customers and attract new ones.

Who is the audience for these guidelines?
This information is most valuable for novice and intermediate level Web designers, but contains tips and other information that may be useful to more experienced designers. As we continue our research and add more information to these guidelines, we hope to make them increasingly useful to experienced designers.

Introduction Clarifying how to use these guidelines.

Planning Getting started on a Web design project.
User Analysis - Competitive and Market Analysis - Strategy - Content - Development Tools and Technology - Schedule of Time and Resources

Design Creating the framework for the site.
Structure - Navigation - Text - Visual Layout and Elements - Media

Production Building all the pieces.
Preparation - Browser Compatibility - Creating Images - Cascading Style Sheets - Final Testing - Rollout

Maintenance Make it a site worth coming back to.
Administration - Advertising Your Site

e-Commerce Topics Selling goods and services online.
Customer Support - Trust - Product Navigation - Product Information - Purchase Transaction

Bibliography Research cited in these guidelines.
Introduction

What are guidelines?
Guidelines represent the middle level of design guidance in a progression from abstract principles to specific conventions.
Below are definitions and examples of each level of guidance:

- Principles--fundamental ideals and beliefs used to guide decision making and achieve a pervasive or overall result
  Example: "Build on users' prior experience."
- Guidelines--recommended courses of action that are in support of a set of principles and specific to a particular domain such as the Web
  Example: "Use Web navigation elements consistently."
- Conventions--specific, agreed-to, prescriptive design practices, typically in support of a set of guidelines and principles
  Example: "Use the IBM masthead across the entire IBM site."

The Ease of Use Group provides Web guidelines, and we also offer UI Design Principles. You may find it useful to develop your own set of conventions based on these guidelines. For example, IBM has developed a set of guidelines and conventions for use in building our own sites, available to IBM employees at w3.ibm.com/standards.

How should these guidelines be used?
We developed these guidelines by studying a cross-section of users and sites, but there may be contexts that we did not examine. If you learn from your user feedback that a different solution works better in your situation than one we offer here, then of course you should do what works best in your situation. To provide the best Web solutions, always use these guidelines in conjunction with a user-centered design process.

Note also that end users' priorities may at times conflict with those of designers, developers, or owners. In such cases, these guidelines will advocate for the users' best interests. The authors acknowledge that, in practice, factors other than the ease of use enter into design decisions. Always be mindful, nevertheless, of the potential impact of your decisions on your users.

What are these guidelines based on?
These guidelines stem from four sources: from our experience using the User-Centered Design (UCD) process to create the IBM site; from user studies over the past few years of the different sections of IBM site, including Shop IBM and this Ease of Use site; from studies of users interacting with non-IBM sites, such as sites that sell books, videos, clothing, and computer products; and from the published research of experts in the field.

How are these guidelines organized?
These guidelines are organized according to a process for developing Web sites. The phases of this process are Planning, Design, Production, and Maintenance. We also offer a special section that focuses specifically on the topic of e-commerce.

How can I print this information?
A "Print: Web Guidelines" button is provided at the bottom of each page. This button links to a single page that contains all the information in the Web Guidelines section. You can then use your browser to print all the information at one time.
Planning

Some questions to address in this stage include:

- What do I want the site to accomplish, sell, or promote?
- Who are my users and what do they want and need?
- What competitive advantage will the site offer over others?
- How can I take advantage of the Web medium?
- What should I consider when creating the project schedule?

User Analysis  Eliciting initial input from users.

Competitive and Market Analysis  Finding a niche in the market.

Strategy  Determining the detailed plan for meeting your goals.

Content  Establishing goals and an initial plan for content.

Development Tools and Technology  Learning about the technology options.

Schedule of Time and Resources  Creating a Web design project plan.

User Analysis

Define your purpose

The first step in producing an effective website is to define your purpose. What do you want your site to accomplish? For instance, assume your company sells exotic fruit. Your initial purpose may be to attract new customers and enable them to purchase fruit online. Although you may redefine your purpose after you have received input from representative users, your statement of purpose will guide you throughout the process of defining your audience, developing your strategy, and creating the content of your site.

Define your target audience

As much as you may wish it could, your site will not appeal to everyone. Your best bet is to choose a particular segment of the population and focus your efforts on attracting and engaging these users. Explore the following issues to develop your list of potential users:

1. Determine who is likely to be interested in the content you will provide. For example, if you want to sell exotic fruits through your site, you may list restaurant chefs, immigrants from the fruits' native regions, managers of upscale produce departments, adventurous home cooks, and vegetarians as potential customers. At this initial brainstorming stage, don't try to narrow this list; you want to look at the full range of possible users.
2. Determine which of these user groups you are equipped to serve. In the example above, if you have a small farm with limited production capacity, you may choose to exclude buyers for large produce departments or large restaurants.
3. Of the remaining list, determine which users in your list have access to the web. Also, which are most likely to use the web for your intended purpose?

Gain input from potential users on the content of your site

Input from users on your content will help you create a site that is relevant and engaging. Ask users for feedback on the quality of your ideas, and ask them to contribute ideas. The Web provides a unique opportunity to quickly gather specific information from users from distant locations. We have developed a set of Web survey templates and a tool for automating the creation of Web surveys. Here are some methods and suggestions for eliciting input from potential users:

Survey Questionnaire

- Post an email survey questionnaire to online discussion groups
- Post a survey on the Web and invite readers of discussion groups to respond (A well-done Web survey is more professional in appearance and is easier to use than an email survey.)
- Ask participants what activities they would like to perform or what information they would like to find at your site
- Present a list of information items or potential tasks; ask participants to rate each from 1 to 5 according to how interesting or important each one is
• Ask participants how they initially find websites such as yours or the one you plan to create (this information will help you plan how and where to advertise your site)
• Offer people incentives, such as a drawing for a prize, to complete the survey

**Interviews**

• Present a site outline or early proposal to prospective users and solicit comments on coverage and suggestions for additional content
• Ask participants to describe in detail the situation in which they might use the proposed website
• Ask participants what they like and dislike about the websites of potential competitors and record their responses
• Ask participants how they would expect to be able to accomplish particular tasks

**Task Analysis:**

• Ask participants to use a competitor’s site, or ask them to perform the tasks that your website will facilitate using whatever means they currently use
• Ask users to voice what they are thinking as they accomplish the tasks
• Observe users accomplishing the tasks and note the order and techniques they use
• Discover which tasks are done most frequently and which are most essential
• Borrow from users’ current expectations for how to perform the tasks, but remember that you want to improve upon the tools and methods they currently use

**Focus Group:**

• Schedule a facilitator with previous experience coordinating focus groups
• Obtain a facility with several computers and a projection screen
• Recruit representative users, perhaps from a user group or email discussion group
• Ask participants to provide anonymous feedback via a computer station, website or email
• Display a list of topics and/or sample pages
• Ask participants to rate their interest in the proposed contents of the site

When you elicit input on the content of your site, you may find that a group in your target audience is not interested in your primary purpose. For instance, you may find that adventurous home cooks are not interested in purchasing fruit online, that they would rather buy fruit at an actual store. You may need to redefine your goal and your target audience based on the results of user feedback.

**Define your audience/user profile**

A clear user/audience profile will help you develop a design strategy that communicates effectively to the people you want your site to reach. Using the input from potential users, follow these steps in order to complete your profile:

• Determine whether your audience is inside the company, in which case you would probably use an intranet, or outside the company, in which case you would use the internet
• Identify the category your target group is in (such as people in the food industry)
• Identify the level of subject expertise within that group (such as food professionals, home connoisseurs, etc.)
• Determine the order of their information preferences, or which pieces of information users want first, second, third, and so on (for example, they may want to first see what fruits are in season, followed by the cost of these fruits)
• Define audience characteristics such as profession, location, gender, age, or lifestyle preferences when they are relevant
• Describe scenarios of use, or those situations or circumstances under which the site may be used (such as a health-food restaurant chef trying to use unusual food items to make the menu more exotic and interesting)
• Describe your users’ range of abilities, and account for vision, hearing, mobility, or cognitive impairments
• Describe your users’ environments, and note any environmental challenges such as poor lighting or noise, and any technical challenges such as screen size and number of colors
• Identify users’ level of technical expertise in using a website (their expertise will affect decisions regarding the technical sophistication of the design)
• Determine what hardware and browser software your audience uses
• Identify what monitors and screen resolutions your audience uses
Competitive and Market Analysis

Conduct competitive and market analysis
To compete effectively in the marketplace, know your competitors and your own relative strengths and weaknesses. Create a design strategy that capitalizes on your strengths and on what you have to offer that is unique. Remember that your competitors will not be standing still; they may be developing new sites while you are evaluating their current ones. Aim to make your site better than what you think their next releases might offer.

Find out who your competitors are
You may have more competitors than you are aware of. The more thoroughly you research who your competitors are, the more this information will help clarify and strengthen your strategy.

- Use a keyword search to find other sites with a similar focus and bookmark them for continued reference
- Ask users who your competitors are
- Check back with these sites frequently in order to see how they are advancing

Rate competitors’ sites
Rate your competitors’ sites and your own site using the list of questions below. You can do the evaluation yourself, or better, you could ask users to do the evaluation. This comparative evaluation will help you determine how you can create a site that is superior to your competitors’ sites. It will also help you determine which aspects of your site you may need or want to improve.

- Is the purpose of the site clear?
- Does the site clearly address a particular audience?
- Is the site useful and relevant to its audience?
- Is the site interesting and engaging?
- Does the site enable users to accomplish all the tasks they need or want to accomplish?
- Can these tasks be accomplished easily?
- Is the information organized in a way that users will expect and understand?
- Is the most important information easiest to find?
- Is textual information clear, grammatically correct, and easy to read?
- Do you have a clear idea of what the site contains?
- Do you always know where you are, and how to get where you want to go?
- Is the presentation attractive?
- Do pages load quickly enough?

Examine other media presentations of your subject matter
Your goal is to develop a site that competes effectively not only against the websites of your competitors, but also against the work they might do in other media. Analyze how other media, such as broadcast or print, present your subject matter, and come up with unique and valuable features a website might offer that these other media cannot.
Strategy

Define your strategy
The more clearly and specifically you define your purpose and strategy, the more efficiently you will accomplish your goals. Whether you want to sell, educate, entertain, persuade or provoke, every part of your site needs to support that strategy. Your strategy should thoroughly consider a balanced relationship between your purpose, the needs and tastes of your intended audience, the strengths and weaknesses of your competition, and your own available resources and capabilities. To define a good strategy, follow the steps listed below:

- Define the message you want to convey. In the case of the web site for exotic fruits, you might want to convince people interested in healthy eating that eating exotic fruits is exciting, healthy, and fun.
- Decide how you will persuade your audience to accept your message. You might decide to educate users on the possible uses of each fruit, to create a lively "hip" ambiance that users will want to participate in, and to make purchasing easy.
- Select a tone. For instance, do you want to be serious and formal or fun and more informal? Visionary or conservative? Dramatic or practical?
- Identify the depth of information or the level of detail that you will offer.
- Select a visual and language presentation approach that will help you meet your goals effectively. To appeal to an upscale audience and develop a site that loads quickly, you might want your site to include original, lively, high-quality flat-toned illustrations that will load faster than high-quality photos.
- Plan site features that will help you meet your goals. You might decide to maintain a chat area where users can exchange exotic fruit stories and recipes, an area containing interesting history on each fruit, and an efficient ordering form.
- Identify your capabilities and how they can be used to meet your goals. For instance, does your staff have the knowledge and skills to write interesting history articles on these fruits? Do you have the budget to pay for high quality illustrations? Does your design and maintenance staff really understand the communication and technical issues involved in keeping a chat area engaging?

Set measurable strategic goals
Set goals that will allow you to determine, once the site is complete, if it is meeting its overall purpose. For example, you may set a goal to have a 10% increase in sales during the first quarter after publishing your site, or to record a certain amount of "hits" on your site. Periodically evaluate your site using these goals, and use this evaluation to help you plan improvements.
Content

Identify information content
In the user/audience analysis, users are asked to rate different topics according to their level of interest in them. When you begin designing, identify the information content that your target audience found most interesting and that will best fulfill your purpose.

Plan content that utilizes web technology in unique and appropriate ways
Users will be drawn to your site if you present your ideas and materials in ways that they could not find in other media. For instance, providing users an area where they can exchange fruit recipes is something they might enjoy, which no other media form can offer.

Design your site so that it is accessible to a full range of users
Provide support for users with physical, environmental, and/or technical limitations. Physical limitations include varying degrees of vision, hearing, mobility or cognitive impairment. Environmental limitations include poor lighting and a noisy work place, and technical limitations stem from lower-version browsers, low display resolutions, low settings for number of colors displayed, and slow modems.

The Ease of Use Web guidelines offered here contain information throughout to assist you in creating an accessible Web site. For a checklist on making sites accessible to users with disabilities, refer to IBM's Web Accessibility Guidelines.

Plan to give users content that will format correct in their browsers
Old browsers do not support frames or JavaScript. Also, only newer browsers such as Netscape 4.x and IE 4.0 will interpret Java applets. If you want your site to be viewed by people who use older browsers or screen readers, you can either provide a version of your site that does not use these new technologies, or you can use new technologies only as a way of supplementing your other content.

For example, assume that you want to offer a web page with a video of how to carve a pineapple. For people with browsers that cannot display the video, you may choose to provide another version of the page that does not feature the video. Or, you may choose to maintain only one version of the page and provide the video as a way to augment detailed textual instructions of the same information.

If you choose to provide multiple versions of certain pages in your site, you can use language script such as JavaScript to detect the type of browser and serve the compatible page. (To download the code for a browser sniffer, see “Browser Compatibility” in the “Production” section.)

Obtain URLs that will enable users to find your site easily
To enable users to find your site and your product information easily, we recommend placing product information within your company domain. In other words, instead of creating specific domains for your products (www.widget.com), use standard URL formats that place the most important product information within the company domain (www.acme.com/widget).

When 69 web users were asked in a survey what URL they would expect to use to find information about the Acme Widget,

- 38 participants listed the URL of the company home page
- 21 participants listed a product page URL with the company name appearing before the product name
- Only one participant listed a product page URL that excluded the company name

When respondents were asked to create a preferred URL for the Acme Widget,

- 54 out of 69 participants placed the company name before the product name
- Only 4 out of the 69 participants submitted URLs that omitted the company name or positioned the product name before the company name

Sometimes product names are better known than company names. If a significant contingent of your audience is likely to look for your product at www.productname.com, secure the domain name and create a pointer from that address to your product page. By using pointer pages, your users will learn about your company and your other offerings.
Development Tools and Technology

Use appropriate tools and technologies

In the planning stage, begin thinking about which technologies you will use to build your site. Select technologies that best accomplish your goals, that you have the skills and resources to work with, and that your audience can use. Below are some of the general benefits and constraints of some web technologies and tools.

**HTML**

Hypertext Markup Language (HTML) is the primary technology used to create all web sites. Some of the elements in the most recent versions of HTML may not work with older browsers. You will need to choose a version that best meets your purpose and the needs of your audience. You can select additional technologies, such as a scripting language, to supplement HTML.

**Benefits of HTML:**

- Loads quickly (exception: Netscape waits for all table contents to load before displaying any of the parts)
- Can be learned and implemented easily (easy-to-use HTML editors are available)
- Can be augmented with sound, video, Java applets, and scripting languages such as JavaScript and VB Script

**Limitations of HTML:**

- Provides only limited control over the way your page will be displayed, and over the appearance of text
- Is not programmable and offers only limited response to user interaction events

**Cascading Style Sheets**

Cascading Style Sheets (CSS) were implemented in the Netscape 4.0 and IE 4.0 browsers. They provide a way to control and adjust layout for an entire site with a single document that defines each style. For more details, refer to "Cascading Style Sheets" in the "Production" section.

**Benefits of Cascading Style Sheets:**

- Provide greater control over layout and typographic properties
- Facilitate consistency of appearance
- Separate content from layout and presentation, which makes the development of a web site more efficient and flexible
- Manage conflicts in style sheet specifications among documents, groups of documents, and user browser set-ups by using a "cascade" or system of preferences
- Allow users to override your font style, size, and color attributes with ones of their own choosing, which is especially important for users with vision impairments
- Allow style changes selectively
- Can be used in conjunction with JavaScript to provide features that give users a richer sense of interactivity
- Allow elements to be positioned efficiently, eliminating the need for memory-intensive transparent GIFs; files are smaller and open more quickly

**Limitations of Cascading Style Sheets:**

- Require more time to learn and implement than other features of HTML
- Are not supported by older browsers
- Are supported in different ways in the new 4.0 browsers (some CSS features do not appear in IE 4.0, and some do not appear in Netscape 4.0)

**Frames**

Frames were developed as an extension to HTML 3.2 and are supported by the newer Netscape and IE browsers (3.0 and up). They create bookmarking and printing problems, so many designers avoid using them.

**Benefits of Frames:**

- Allow content pages to be developed independently of navigation pages
- Allow the user to scroll through content without scrolling the navigation and identification areas out of sight; navigation and identification areas are always available

**Limitations of Frames:**
Present usability problems for tasks such as printing, bookmarking, searching, and using the browser back button
May necessitate a no-frames version of your site to provide accessibility for users with older browsers or those with
disabilities who use assistive technologies
Add more complexity

Scripting Languages
Scripting languages such as JavaScript and VB Script are used primarily for client-side programming, while CGI scripts are
often used on the server side. Client-side scripting allows for control and manipulation of HTML and Cascading Style Sheet
elements.

Benefits of Scripting Language:

- Allows for interactive, network-aware, and cross-platform applications
- Is easier to learn than Java
- Adds dynamic and interactive behavior to a web page

Limitations of Scripting Language:

- Behaves differently on different browsers and between browser levels
- Can be read by only some browsers as low as 2.0, and not by any 1.0 level browsers
- Cannot be read by some assistive technologies used by people with disabilities
- Is difficult to debug
- Provides limited functionality compared with Java applets

Java Applets
Java Applets allow you to encapsulate a piece of function and embed it in a web page.

Benefits of Java applets:

- Allow for interactive, network-aware, and cross-platform applications
- May be used within other applets or applications on the same page
- Are not yet supported well by assistive technologies used by people with disabilities

Limitations of Java applets:

- Are not yet supported well by assistive technologies used by people with disabilities
- Must be downloaded before they can run, can be a lengthy wait
- Provide only limited access to system resources
- Function only when the web page being viewed is in a browser window
- Often require substantial memory, and the files remain in the browser cache until emptied
- Can only be executed/run by Netscape and IE versions 3.0 or later

Schedule of Time and Resources

Schedule development timeline
Create a schedule to help ensure that you meet your development deadline. Below is a sample schedule. Start by making a
table (step A) which lists each step in your process, followed by the number of working days each step will take to complete
(step B). Include user tests throughout the plan.
<table>
<thead>
<tr>
<th>Step</th>
<th>Completion Date</th>
</tr>
</thead>
<tbody>
<tr>
<td>A</td>
<td>Feb 2</td>
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<td>B</td>
<td>Feb 4</td>
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<tr>
<td>C</td>
<td>Feb 16</td>
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<td>D</td>
<td>Feb 19</td>
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<td>E</td>
<td>Feb 24</td>
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<td>F</td>
<td>Feb 25</td>
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<td>G</td>
<td>Feb 26</td>
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<td>H</td>
<td>Mar 12</td>
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<td>I</td>
<td>Mar 19</td>
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<tr>
<td>X</td>
<td>Apr 22</td>
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<tr>
<td>Y</td>
<td>Apr 23</td>
</tr>
</tbody>
</table>

Next (step C, below) work out each step into a Gantt chart. You need to consider those steps that occur serially versus those occurring in parallel, and a Gantt chart is a good format for visualizing the relationship between these steps. Also consider weekend and holiday dates which will be recognized by your team. In order to control your schedule throughout the project, it is critical to understand which steps of the project are affected if there is a change in the completion date of any individual step.

Plan for an iterative development and design process

Development is characterized by a process consisting of a series of stages. In successful development these stages naturally occur in sequence, however it is inevitable that discoveries made during one stage will cause you to revisit a previous stage. For instance, you may begin making a prototype which you believe is based on a good idea, but as you see the physical prototype develop, you may realize you need to reconsider some aspect of that original idea. You should not expect each stage of the process to go perfectly the first time. The cyclical nature of the development process is also known as “iterative design”. Your plan should allow time for more than one pass through each stage of the process.
Plan budget

Your resource budget needs to account for the following:

- Personnel: technicians, designers, and editors to maintain the server and the content
- Hardware: production machines as well as a hardware test environment for staging and testing the site
- Server: either a server, domain name, and network lines, or an ISP for hosting your site (Make sure the server you will use is capable of handling the programs you want it to run, such as Java, and the amount of traffic you expect it to receive)
- Software: search engines, authoring tools, visual design tools, scripts to support feedback mechanisms, database software

Assign a team

Make certain you have the skills necessary to complete a Web development project. Below is a list of skill areas and the activities that must be completed within those areas. The exact titles and number of people who fill these functions will vary according to the size and goals of the project and the organization.

- Project Management
  - Client contact
  - Communication of project requirements
  - Project scheduling
  - Budget planning
  - Resource allocation
  - Assures copyright compliance
- Usability Engineering
  - Users and task analysis
  - Communication of user and functional requirements
  - Management of user evaluation of design
- Media Design
  - Information structure design
  - Prototype design
  - Design of communication concept and physical media
  - Design of physical interface, navigation, interaction
  - Style guide writing
- Content Management
  - Provision of domain-specific knowledge
  - Writing and editing
- Implementation
  - Planning hardware and software requirements
  - Programming and scripting
  - Producing imagery, sound, and other content elements
  - Performance testing (testing for speed, accuracy of link connections)
  - Accessibility testing (alt text on images, titles on frames and pages, etc.)
  - Site transfer to server
- Maintenance
  - Maintenance on content and links
  - Server maintenance, database support
  - Creation of content updates (text, graphics, programming)
  - Quality, performance, and accessibility testing of any new content
  - Customer/user support and communications
  - File administration

Schedule user involvement

Scheduling user involvement appropriately in various stages of the development process will improve the effectiveness of your design. Remember to allow time in your schedule to make the changes that testing indicates are necessary. The best time to involve users is early in the planning and designing stages, so that you will have time to make changes based on their responses and still meet your deadline. The following types of user input and feedback are particularly valuable:

- Gain input from users on the goal and content of the site (See "User/Audience Analysis" in the "Planning" section)
- Gain input from users on the organization of the content (See "Structure" in the "Design" section)
- Gain feedback from users on the proposed site visuals and/or site metaphor (See "Visual Layout and Elements" in the "Design" section)
• Gain feedback from users on site navigation (See "Navigation" in the "Design" section)
• Provide a way to get feedback from users once the site is published (See "User Feedback" in the "Maintenance" section)

Assign work to content providers and experts
Identify which content is already available and which content needs to be created. Determine who has the expertise needed to provide each piece of content, and assign the work to the appropriate people.

Communicate your project plan with your team
Create a document that will guide and unify the efforts of the team, and/or clarify your intentions for the client. You may want to do your project plan on an intranet using HTML. This experience would be particularly useful for any members of your team who are unfamiliar with HTML. Your project plan should include the following information:

• Goals definition
• User/audience profile and evaluation
• Results from task analysis
• Competitive analysis
• General strategy
• Projection of recommended web development tools, and how and why they may be used
• Prioritization of content into that which is necessary, and that which is merely desirable (consider whether desirable content can be added in the future)
• Team assignments and individual responsibilities
• Team communication mechanisms (meetings, databases, minutes, distribution lists)
• Activity tracking processes to manage who is doing what
• Problem and issue management processes
• Schedule and publish date

Design
Some questions to address in this stage include:

• Does the navigation design enable users to move around easily?
• Is the content organized such that users can easily find what they need?
• What visual style do I use to appeal to my audience?
• Is there a consistent look throughout the site?

Structure  Making it easy for users to find what they need.
Navigation  Making sure users can move around in the site easily.
Text  Designing text that is easy to scan and read.
Visual Layout and Elements  Providing page layouts that meet users’ needs.
Media  Using animation and other media effectively.
Structure

Develop a user-centered structure for your site

For your site to be successful, you will need to organize information in a way that makes sense to your users. People develop expectations for how to find different types of information and how to accomplish particular tasks. They may expect to search alphabetically (as when using a phone book), according to groups of similar items (as in a grocery store), or in a sequence of steps to fulfilling certain tasks.

Recruit some representative users to help organize the information content of your site in a way that seems most logical to them. Card sorting is a test method we have used:

- Create cards of topics your site will cover
- Ask representative users to sort the cards into logical groups
- Analyze the groups that your users create and determine the optimal organization structure for your site

For more a detailed description of Card Sort Testing, and a tool to help you analyze card sort data, check out EZ Sort in the Ease of Use Downloads.

In your user analysis, you may have done a task analysis--analyzing how people accomplish the tasks that your web site will facilitate. You can use this analysis to organize the steps within the tasks according to user preferences.

Use the information from your task analysis and/or card sort to create a flow diagram showing the relationship of elements of information with each other.

Create a flow diagram

A flow diagram defines the site structure, identifies all pages within the site, and shows the pathways linking each page. Its purpose is to organize the development of the site, and should be easily visible to all members of the team. Below is a portion of the navigation map for this site (dotted lines represent paths to pages not shown here.)

![Flow Diagram](image)

List the elements and links for each page of the diagram

Make an itemized list of each page's contents. Your list should include text, images, sounds, video and audio clips, image maps, animated GIFs, Java applets, downloadable items, controls such as print buttons, and all links. Organize your list into categories that distinguish those items that will appear on every page versus on certain groups of pages or on individual pages only. For instance you may have a link to your home page on every page, and a print button only on certain pages. Organizing your list into categories this way before beginning your layout will help make sure you leave enough room in your layout for everything you need, and will help prevent you from forgetting items.

Design hierarchies of breadth rather than depth

Research suggests that users begin to lose their bearings within a hierarchical structure once they go beyond the third level. As William Horton notes, flat hierarchical structures may cause users to have to scan longer lists of menu items, but users “will get lost less often” (1994, p. 170). Refer to Horton’s *Designing and Writing Online Documentation* for more detail.
Navigation

Use labels that clearly indicate the function of links

Use labels that accurately describe the destination and/or resulting action of links. Avoid using meaningless labels such as "Go" or "Click Here." Instead, enable users to scan and quickly identify links they want to take. Vision impaired users scan for links using screen readers. For this feature to be useful, however, link labels must make sense on their own, or out of context.

Provide feedback that tells users where they are in your site

Provide visual feedback that responds when users make a selection, and remains dominant until they make a new selection. Good feedback in the design of links includes visual and possibly audio changes that occur in stages:

Use navigation elements consistently

Once users see a link, they expect when they see it again it will look the same, be in the same location, and function the same. If it has changed, users may be forced to relearn the button, which will delay their completion of tasks.

Provide persistent links to the home page and to high-level site categories

Provide links to the homepage and high-level site categories on every page of your site. These persistent links enable users to easily navigate from one area of the site to another.

Be sure the persistent links include a link to your shopping pages, or links to important sections of your e-commerce pages. Feature these links either in the masthead or in a left-side navigation bar because these are the areas users expect to find them.

Ensure that image maps are accessible to vision-impaired users

In general, use client-side rather than server-side image maps, and provide alt text for each hot spot. For client-side maps, HTML code defines the clickable regions of the image and the destination of links. The processing of the image map occurs on the client's system. Client-side maps provide better accessibility since they can be used with alt text. They also load and process more quickly because they require less communication with the server.

For server-side maps, the server defines the clickable regions of the image and the destination of links. They are useful for maintaining maps with links that change frequently, but screen readers for the blind cannot extract any descriptive information about server-side maps. If you must use a server-side image map because the image and its links will change frequently, provide HTML text links below or near image map that repeat the links that appear in the map.

Include a "skip to main content" link at the top of each page

At the top of each page, include an invisible "skip to main content" link that allows vision-impaired users with screen readers to avoid listening to navigation links, such as those in the top banner, that repeat on every page. This link can be invisible to sighted users by using a tiny image that is the same color as the background with alt text = "skip to main content." The link should take users to the top of the content section of the page. For instance, in these guidelines, it takes users to the heading above the first guideline on the page.

The ability to skip navigation items is particularly useful on sites that use a top banner and left-side navigation bar. On these sites, a link to the main content can save users substantial time. It also eliminates monotony and provides greater control over the interface.
Test the navigation design

To determine whether users can find information easily, test your navigation design as soon as possible. You do not necessarily need all the links to be active or all the pictures to be in place, but you will need the significant navigation mechanisms to be working and some of the content to be placed. Ask representative users to find particular information. In your testing, answer the following questions:

- Do users know how to find the information they need?
- Does your navigation design connect all related information in a sequence that makes sense to users?
- Do users know where they are in the site structure?
- Do users know how to return to points they visited previously?
- Are there any unnecessary links that clutter the navigation design?

Text

Create effective headings and place important information first

By using headings that quickly communicate the contents of sections, you will enable users to quickly scan through information to find what they want. Similarly, for body text, if you follow the inverted pyramid strategy used in newspaper writing, users can read salient information immediately and then read additional information if they want more detail.

Keep links separate from narrative text blocks

Links can add to the depth of information in your site. However, too many links within a block of text can disrupt continuity and understanding. Where possible and appropriate, place links at the beginning or end of paragraphs or sections of narrative text.

Design for default browser fonts

Browsers display different default font types and sizes, depending on the type of browser, browser version, and operating system the browser runs on. Make sure your text looks good when displayed in the client environment. The default fonts for PC computers are Times New Roman and Arial. For Macintosh, the default fonts are Times and Helvetica. You should at least check that your design succeeds using these fonts. Some users modify their browser preferences to display font types and sizes of their own choosing, and these choices are not possible to anticipate. If your design looks good with the default fonts displayed by your users' browsers, you have maximized your control over the appearance of text.

Make paragraph text flush left

Text which is flush left is easier to read than text which is either flush right or centered (this also aids reflow if the user resizes their browser window frame).

Test for readability

The readability of online text is affected by a variety of factors including font type and size, and color contrast between the text and background. Since color appearance varies between different monitor types, you should test for readability using a variety of monitors.

To learn more about designing readable type, refer to *Stop Stealing Sheep* by Erik Spiekerman.

Provide a means for users to print groups of related pages

Since some users prefer to read hardcopy, provide an easy way for users to print related sets of pages. If your site is divided into sections, you may want to give users controls so they can print these sections as well as individual pages. In this site, we have provided a way for you to print the entire set of guidelines as well as particular pages.
Visual Layout and Elements

Design within boundaries of an "image-safe" area

Anticipate your users' screen resolution settings and the size of their monitors. Use this information to define a dimension for the "image-safe" area. Allow room for browser elements such as navigation buttons and scroll bars. In the illustration to the right, the main title "Forget Me Not" does not fit into the image-safe area. This may misinform users, because unless they widen the browser window, they will read the message as "Forget Me."

Design in a style that will appeal to your audience's tastes

Use your audience profile and strategy definition to define a visual style for your site which they will find appealing. A reference site for a general corporate audience will need to convey a different image than a site which should appeal to restaurant managers and hobbyist connoisseurs interested in exotic fruit.

Test the visual design

Before you begin coding and creating the visuals for your site, ask users to evaluate the planned visual style. Create some quick paper sketches that are easily revised. Offer your participants alternative sketches of different designs. Consider asking each participant the following questions:

- What would you perceive as the purpose of the site based on this presentation?
- What would you be looking for once you arrived at the site?
- What would you do next after seeing this presentation?
- What do you like and dislike about the presentation? (ask about the user's reaction to the metaphor if a metaphor is used in the presentation)
- What impression would you form of the company [organization] based on the visual style?

Creating simple sketches are valuable not only for soliciting feedback from users, but also for communicating your purpose and plans to other team members.

Establish and/or comply with your organization's design conventions

Many organizations have an established set of design conventions that dictate how their logo and related elements of corporate identity are to appear on stationery and other materials. Consistent design conventions help your organization become more recognizable to the public. If your organization does not have a set of design conventions that apply to web design, you might suggest that one be established.

Maintain consistent visual identity

Establish a visual identity by using related visual elements throughout your site. A consistent visual style gives a site a sense of unity and reinforces users' experience that they are rooted in a certain place.

Present your message efficiently and avoid clutter

Your words and your design will be more powerful if you can say more with less, so be rigorous about eliminating superfluous elements. Every element of your design should support the goal of your message. While using purely decorative elements is legitimate, keep in mind that a tremendous amount of information is competing for users' attention. Information overload can cause discomfort and prevent users from finding the information they want to find.

Draw attention to new or greatly changed content

Regularly updating your site will increase its value and give users incentive to return. Make it easy for users to see what you have added and when you added it as soon as they enter your site. Enable users to go directly to the new information without wasting time reviewing areas they have already seen. You can provide direct links from a "What's New?" area to the new information.
Avoid requiring users to scroll in order to determine page contents

Users should be able to recognize immediately whether the subject of any given page interests them. Elements that are critical to identifying page contents need to be visible in the image-safe area without scrolling.

Avoid requiring the use of horizontal scroll bars

Avoid using images and tables that are wider than your defined image-safe area. If images and tables are wider than the browser window, a horizontal scrolling bar will appear. Users often become annoyed if they have to manipulate a horizontal scrolling bar to see content.

Use the top and left areas of the page for navigation and identity

Display navigation and identity in the top and left areas of the screen. A masthead at the top of each page works well for displaying a company logo and high-level site categories. The left area of the screen is useful for displaying navigation links within a category. Users are comfortable and familiar with this design. It also clearly and consistently separates navigation from content so that users know where to find each. This layout has tested well with users of the IBM site.

Media

Provide user controls

Give users the following types of controls for all playable files: Play, Pause/Resume, Stop, Rewind, Fast Forward and Volume. QuickTime video and sound files automatically provide these controls. If you use other types of media formats, you may need to design the controls yourself. Animated GIF's are usually presented with no user controls. In general, provide Play and Stop functions by using a scripting language.

Provide text equivalents for visual and auditory content

To make your site accessible to users with vision and hearing impairments, provide text and/or audio descriptions of visuals, and transcripts (word-for-word text versions) plus descriptions of audio content. Many people cannot use video, images, or sound, but they can use equivalent information provided via other media. The equivalent text or audio descriptions should convey the same information as the video or audio content.

Use the right technique for providing accessible multimedia:

- For images and animation, use alt text to provide a brief description, and the longdesc attribute to provide explanations longer than a sentence or two. Longdesc provides an invisible link read by screen readers to a detailed description located on a different Web page.
- For audio and video, provide a hyperlink to a transcript plus a description near the play button or link to the clip. Descriptions should generally be longer than transcripts because they need to describe the setting and action.
- For Java applets, provide alt text, and if the applet uses the OBJECT element, provide text descriptions within the element.

For examples of these techniques being used, refer to the IBM Web Accessibility Guidelines.

Inform users of the content and size of media objects

Instructions for downloading media objects should include the file size, the media type, and a description of the subject matter. For video clips, you can provide a static, interlaced thumbnail image with alt text for screen readers. This information will help users determine whether they want to wait for the download.

Use animations to attract attention
Movement attracts the eye. If you draw attention to an element by making it move, you may cause it to seem more important than surrounding images which remain still. If you place animated images near still text, be careful that the animations do not distract the reader. And if you animate text, make sure you control the timing and test to make sure that the text is still readable.

Create animations that enhance explanation

Some animations are used to entertain, but you can also use them to explain. They are particularly good for explaining ideas involving changes in time, position, and/or process.

Use repetitive loops sparingly

Animation or sound loops are efficient because they can run continuously without adding to file sizes. However, they can become irritating or distracting. Knowing how to design a media loop well requires judgment and sensitivity to the situation. Test to make sure that users are comfortable with your media loops and consider enabling users to stop the loop.

Production

Some questions to address in this stage include:

- How do I minimize the size of files and images?
- How do I structure my files to support efficient updating and maintenance?
- What testing do I need to do before I publish?

**Preparation** Establishing conventions for file management.

**Browser Compatibility** Supporting different browsers.

**Creating Images** Creating images to meet performance requirements.

**Cascading Style Sheets** Making good use of Cascading Style Sheets.

**Final Testing** Ensuring the site is ready for publish.

**Rollout** Publishing the site.
Preparation

Establish directory structure and file naming conventions
Consistent file structuring and naming conventions make it easier to find and organize files, and to continue the work of developing the site.

- To manage your content and accurately code your relative links, match the file directory structure to your site structure.
- To avoid broken links, make all file names lowercase unless a program, such as a Java applet, specifies otherwise (on a case-sensitive server, home.html is not the same as Home.html).
- If you are doing cross-platform development, establish file-naming conventions that accommodate all platforms (you may want to use the DOS rules for formatting file names because all platforms support this format: limit file names to eight characters and file types to three characters, sometimes known as "8.3")
- Use names that describe content so that it isn’t necessary to open the file in order to know what it contains.

Establish a method for version control
The procedures you establish to manage developing versions of your site will begin in production and continue throughout the future maintenance of your site. The procedures should be clearly defined so that it is easy to follow them consistently. In most cases, you should not throw out older file versions of your site because you may want to refer to them later. You should also keep back-up copies.

- Decide how you will identify different versions (by file dates, by file names, or by directory names).
- Decide how many back-up files you will create, how often files will be backed up, and where they will be stored.

Generate page templates
Use page templates to ensure layout consistency throughout the site and to separate the content and the interface. Separating the content and the interface will help you avoid having to place an element in multiple HTML files.

Templates should include your own design decisions for the site and any conventions dictated by your company or organization. They should also adhere to Web accessibility guidelines. Addressing accessibility at the level of templates will make the fundamental structure of your site accessible to users with disabilities. It will also make it easy for content providers to make individual pages accessible. For a complete list of Web accessibility guidelines, see IBM Web Accessibility.

Templates can be implemented using server-side includes, database forms, scripts, or simple, coded ASCII files. Items often found in templates include calls to standard CSS and JavaScript files and common header, footer, or navigation elements.

Separate content from the interface
Developing content independently from the user interface allows you to develop both more efficiently. If the two are developed interdependently, then every change made in one would have to be immediately considered in the other. Frames, JavaScript, and Java applets all allow you to separate the interface from the content. For example, the text in this guideline is used in both the print-all version and the frames version without modification.

Use relative links instead of absolute links
A relative link (images/example.gif) is easier to create and move than an absolute link (http://www.ibm.com/ibm/hci/guidelines/web/images/example.gif). Relative links allow you to test out the site on your local hard disk and then transfer the site to the server without changing the code for the links.
Browser Compatibility

Create alternate versions to support multiple browsers

If you want to use new Web technologies, such as layers, frames, or JavaScript, and you also want your site to be accessible to people who use lower level browsers and old screen readers, then you will need to create an alternate version of your site. The alternate version should be produced without relying on frames.

Make use of browser sniffers

Use a browser sniffer to determine which site version should be sent to each user. Sniffers use a scripting language like JavaScript or CGI to determine various aspects about the user's browser, such as its version, level of JavaScript, browser name, ability to interpret Java, installed plugins, etc. The example HTML file below will load one of three HTML pages when the link is clicked. It determines which page to load based on the version of JavaScript supported on the browser.

Creating Images

Produce images that will load quickly

Since users need web pages to load quickly, you should make your image files small. In this site we try to limit the size of individual images to 5k, and try to limit the total size of all the images on any single page to 20k. Because GIFs are usually smaller than JPEGs, try to use GIFs whenever possible. This trade-off is discussed below.

Use colors that succeed on a variety of platforms

To make your colors look good on a variety of platforms and monitors, design your images using a cross-platform, browser-safe color palette comprised of 216 colors (sometimes referred to as a Web safe color palette). You can download our Web safe 216-color palette, which contains the hexadecimal color codes HTML requires for specifying colors.

216-color browser-safe palette (size: 48k)

Produce images in the most appropriate format
GIF formats are better for some types of images, and JPEG formats are better for other types of images. GIF formats are particularly useful for images that contain flat areas of color (example #1). If you save such an image in a JPEG format, the JPEG formatting process may introduce unwanted artifacts into your image (example #2).

GIF images are usually smaller and load faster than JPEGs. They limit you, however, to using a 256 color palette, and they also require you to choose either a dithered or non-dithered format. Example #3 shows a non-dithered GIF, and example #4 shows a dithered GIF. Dithering is a process the computer goes through when it encounters a color that is not in its palette. In this process it combines two colors in its palette to approximate the appearance of a third color.

JPEG formats are best for images like photographs that contain numerous changes in color tonality. JPEG images look best on monitors capable of displaying 16 million colors (16-M). Monitors that display 256 or fewer colors cannot produce this range of colors. JPEGs, moreover, usually take longer to download than GIFs. (If you are viewing this site on a 16-M color display, the difference between examples #4 and #5 will be more apparent than if you are viewing it on a 256 color display.)

If you want an image containing a range of color tonality to look good on a 256 color display, you can save it as a dithered GIF. A dithered GIF retains some color tonality (example #4) and is smaller than the same image saved as a JPEG (example #5).

You can make simple web animations made of a sequence of GIF images called animated GIFs. An example of an animated GIF is the dancing feet illustration in Create animations that enhance explanation.

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**Reduce the size of image files**

Color-rich images tend to be large. Make images smaller by reducing the size of the color palette. If you make the color palette too small, the image will become too degraded. The goal is to make the file as small as possible while still retaining sufficient image quality. Start with a high-quality image and produce versions using successively smaller color palettes until image degradation becomes too apparent. The JPEG image on the right is a little less rich in color and detail, but less than half the size of the JPEG image on the left.

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**Re-use images**

You can decrease load time by re-using images. Once they are loaded in the browser's cache, they will display on the screen faster. Graphics for site identity and navigation are often the easiest to re-use.

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**Use interlaced GIFs**
Interlaced GIFs render progressively, allowing the viewer to begin to identify the contents of the image without waiting for the full download. The top image shows the way a non-interlaced GIF image appears as it begins to draw on the screen; users may not be able to tell whether they want the image until it has fully downloaded. The interlaced GIF (center) appears initially as a full image which is not fully focused, but it often reveals enough information for the user to quickly recognize the image's contents. The bottom image shows the fully rendered picture.

Save images at a resolution appropriate for your users' monitors

Because few monitors display images at resolutions greater than 72 dpi, you may want to limit the resolution of your web images to 72 dpi. A higher dpi ratio will not produce better image quality on most monitors and will increase file size, causing each page to load more slowly. If you know that many of your users have higher resolution monitors, use images of corresponding resolution.

If you have decided to create a version of your site specifically for printing, you may want that version to have images with a higher dpi. Most low-end printers are 300 dpi. The higher the dpi, however, the longer users must wait to download the printable version.

Use Alt text for all images

Use alt text to provide users a short description of images. Alt text:

- provides vision impaired users access to your content (screen readers read the descriptions)
- helps sighted users determine whether they want to wait for an image to load
- enables users to read a description of a linked image and take the link before the image loads

Use alt = "" for images that do not convey important information or convey redundant information. The alt tag without text informs users with screen readers that there is a picture for which a description is unnecessary.
Cascading Style Sheets

Cascading Style Sheets (CSS) work on the same premise as style sheets in print layout software programs: they allow you to manage the structure of the site separately from content. Text styles and content can be modified independently from each other, allowing developers to update web sites more efficiently. CSS enables you to improve the appearance of your site, and can be created with the same simple text editors as html. "Cascading" refers to a system of preferences for managing style conflicts. A conflict can occur, for example, when a user's browser preferences indicate text to be displayed in one font, while an incoming document style sheet calls for a different font. The cascade preferences will ensure the conflict is resolved and pages can be displayed.

Cascading Style Sheets give designers additional control over typographic features such as line spacing, margin indents, and font selection. You can specify the position of elements using CSS rather than the more memory-intensive transparent GIFs. This allows your files to be smaller and to be opened more quickly by browsers.

When appropriate, define styles globally

- Styles applied globally affect the entire web site; style rules should be provided in independent text files which are linked to or imported into multiple html files.
- Styles applied locally affect only a single file, and the style rules are stored in the top of the html file.
- In-line styles are specified within the body of the document content, and affect only individual text elements. Use them only when absolutely necessary, since they are inefficient and hard to maintain.

Your system of Cascading Style Sheets will work best when you assign styles at the highest appropriate level. If you apply a style sheet globally, you need to apply it only once. If you apply a style locally when it should be applied globally, you will need to place the code in more than one file. Also, if you apply styles globally, you can more easily make revisions to the layout of your entire site.

Whenever possible, use style sheets to position elements

Using style sheets to define the placement of elements is more efficient and manageable than using absolute positioning. Using style sheets to position elements gives you more control and consistency. Absolute positioning gives you control on a specific page but is less efficient and harder to maintain.

Use inheritance to propagate styles in CSS

Cascading Style Sheets employ a system of inheritance, in which the lower-level or child styles inherit properties from higher-level or parent styles. To produce an efficient style sheet system on a project, you should analyze your layout plan to see what features certain styles share with other features, and then decide where in the inheritance scheme every text formatting specification should take place.

Use absolute and relative style specifications

To avoid manual and tedious adjustments to styles, take advantage of absolute and relative style specifications. For example, assume you use an absolute setting for the body text, such as "BODY {font-size: 10pt}" and a relative style for a level two heading, such as "H2 {font-size: 80%}". If you later change the size of "BODY" to 12 pt., the H2 style will automatically make itself larger, preserving the 80% size relationship.

When specifying fonts, provide the desired font, an alternate font, and a default font

The cascading system works by making choices and compromises among groups of options. For the system to work properly, alternate font specifications should be provided within the style sheets. For example, you could have a style sheet which states "BODY {font-family: Officina, Arial, sans-serif}". This will cause users to see Officina if they have it, Arial if they don't have Officina, and whatever sans-serif font is alphabetically at the top of their own font list if they have neither Officina or Arial. (The last font specification is a default one, which is not a specific font but rather a class of fonts).

Use rule exceptions with caution

Since the keyword !important will override a users' settings, use it with extreme caution. In general, you want your users to have control over their settings. For instance, people with impaired vision might not be able to read any of your text if you use !important to require them to read ten point font.

Define a clear policy for the entire team to follow

A system of Cascading Style Sheets can become complex, particularly on a large site. Make it easy for other people to understand how your system works so they can make any subsequent changes in an integrated manner. Before adding a style sheet to an existing site, make sure you understand the existing style sheet formatting policy.
Final Testing

Make sure you have provided clear error messages

If an error occurs, users need to know why it occurred and what they can do about it. If they receive a message only showing an error code number, they will be confused. Purchase server software which allows you to customize error messages.

www.ibm.com error: Document not found
The document you have requested, does not exist on this system or is not available to your site.
Please check the URL and try again.

Stage the site

As individual files are developed, move them onto a shared web server that is protected from public view. This will give you more accurate performance test results than you would get testing them on development workstations. It also allows the development contributions of various team members to be seen by everyone and to be evaluated in the context of the entire site.

Conduct quality assurance test

There should be a final check on the content to make sure nothing was missed earlier. Ensure the following:

- Standard spelling and standard grammar
- Links go to the correct locations
- Pages, forms, graphics, applets and scripts display and behave correctly
- Pages print correctly (text does not bleed off the page)

Test to verify accessibility

Test your Web site to ensure that it will be accessible to users with disabilities. To test for accessibility:

- View the page in a Web browser with various display settings customized (e.g., disable images and see if the page is still readable; enlarge the font and ensure that all text scales to a larger size)
- Print images and pages in black and white to see if they are usable to people who are color blind or people who are using a device without a color screen
- Use an accessibility validation tool such as Bobby
- Observe vision-impaired users with screen readers accessing content on your site, or blindfold yourself and access your site with a screen reader such as IBM Home Page Reader

Make any changes that testing reveals are necessary. The IBM Web Accessibility Guidelines contain detailed testing techniques for validating each accessibility checkpoint.

Conduct performance testing

Generally, a user with a 28.8 modem should have a sense of the page content or be able to navigate off the page within 10 seconds of download. The rest of the page should load within the next 30 seconds. Users may be willing to wait longer for specific content such as, for example, an online mortgage planner. Users tend to be less tolerant of slow navigation pages.

Observe users accomplishing a set of tasks

By this point in the development process, you have already

1. Gained input from users on your content
2. Asked users to organize the information at your site in a way that makes sense to them
3. Asked users to evaluate the visual style or metaphor for your site
4. Asked users to find information in an early version of your site

If the look of your site and/or its structure has changed significantly since the early test of your navigation system, you will need
to re-test the navigation design. Ask users to accomplish a set of tasks with all the pictures and text in place. Verify that:

- Users can find the information they need to find
- Users know where they are in the site structure
- Users can distinguish between static graphics and graphical links
- Users are able to see important information without scrolling

**Test in the client environment**

Web pages can look and behave very differently depending on the browser, operating system, system fonts, screen resolutions, and internet connections. The appearance of colors can vary based on screen resolution, color depth of users’ monitors, and video card drivers. The only sure way to get an accurate picture of how your site will look to users is to view it in the varied situations that they will view it.

Be sure to test your pages on all targeted browsers platforms, and system settings. The following items in particular behave differently across different browsers and browser versions:

- HTML and HTML extensions (particularly HTML 3.2 extensions)
- JavaScript, Visual Basic Script, ActiveX and Java applets (use comments to hide script language, which sometimes appears in the view of older browsers)
- Table features, such as background colors in cells
- Page layout and default fonts

**Rollout**

**Move the site to the destination server**

Move the site to the destination server where it will be accessible to your users. If availability is important for your site, you will want to make this move during a low usage time such as the middle of the night. If the files will take some time to copy, you may want to take the servers off the network temporarily so that the site is not corrupted with a combination of old and new files.

Warn the people who frequently use the site if your server is going to be down for any reason. You may want to send these frequent users email. Another way to inform users is for all links to go to a page that says the server will be down until such and such a time.

**Test the site on the destination server**

If publishing your site means moving it onto a different server than the one it was developed on, you should conduct quality assurance and performance testing on the new server. The new server may introduce new behaviors. Make certain that the links work and that the scripts for forms work in the way that you planned.

**Make a backup**

Files can become corrupted for any number of reasons (e.g. hard drive crashes, actions by the server administrator, malevolent hackers, etc.). Make a backup so that if necessary you can restore your files to the server.

**Maintenance**

Some questions to address in this stage include:

- What do I need to do now that the site is up and running?
- What routine administration activities do I need to be aware of?
- How do I continue to attract and engage users?

**Administration** Keeping your site healthy and vital.

**Advertising Your Site** Making sure your Web site gets the attention it deserves.
Administration

Keep users up-to-date on content changes
When appropriate and practical, tell users what content you changed, and when you changed it. This information will help them find new material easily. You may want to provide a "What's New" section that is easily accessible from the home page, or link directly to the new material from your home page. You may also want to indicate new content on a particular page with graphical cues.

Maintain links
Dead links frustrate users. Check all of your links periodically and correct or remove the ones that are no longer working. Note that you should check an external link more than once before deleting it; it may be only temporarily inaccessible if its server is down. The tracking report generated by your server software can tell you the location of broken links.

Maintain version control
Keep all versions of your site organized so you can update files or refer to previous versions efficiently. Maintain the naming and file directory system you established during the original development of the site. Continue to back up your files and store them safely. Document your procedures for naming and structuring files so others can learn your system easily.

Track site activity
The more you know about user activity at your site, the better prepared you will be to plan future updates. Tracking reports generated by server software can provide you with the following information:

- The number of visits your site receives, which indicates how well it is advertised and how popular it is with users
- The number of disconnects, which indicates technical problems that need correcting
- The pages users link from when they connect to your site, which can help you refine your advertising strategy and even make you aware of categories of users you had not previously considered
- The order in which users view your pages, which can help you assess your navigation and information design

Respond to users who give you feedback
Responding appreciatively to users when they give feedback will help you develop a positive ongoing relationship with them. They will be more likely to offer feedback in the future if they know you are interested in what they have to say. Let them know that you take their suggestions seriously, and let them know when you make a change based on their feedback.
Advertising Your Site

Place keywords in the meta information
To enable users to find your site using a search engine, place keywords in the meta-information of your web pages. Search engines use keywords to identify the topics of web pages. Ask users what methods they would use to find a site such as yours, and particularly what keywords they would use to search with. You can elicit this information in your early users analysis, or you can informally elicit it at any point during the development process.

Announce your site on relevant news groups and bulletin boards
Internet news groups are a great way to reach a targeted audience. Many web users read news groups, and there is no fee for sharing information. Your news group notice should read as a pointer to information of interest rather than as an ad. Be sure to follow the etiquette and rules of the group.

Advertise on major sites
Some sites for web searches, such as Yahoo and Netscape, provide a way for you to advertise your site. Large numbers of web users visit these search engines, and you can reach some of these people with an ad. These sites charge fees to place ads, so this suggestion applies mainly to commercial sites.

Advertise through other media, such as magazines, radio and television
You can also attract users to your site by advertising in other media. Radio, TV, billboards, and store signs all provide ways to advertise your site.

e-Commerce Topics

e-Commerce has ballooned into a multi-billion dollar market, and the competition in this market is fierce. Companies that offer the best user experience are the ones most likely to succeed on the Web. To help companies succeed online, IBM has developed guidelines addressing the issues of trust, customer support, product navigation, product information, and the purchase transaction. In each of these areas, our goal is to make buying goods and services comfortable, easy, and enjoyable.

Key Terms
Below are e-commerce terms used frequently throughout these guidelines, and their meanings as they are used on this site. Lesser-used terms are defined in place, as they appear.

order list - Also known as a shopping cart, a list of products that the user has identified as being under consideration for purchase.

order list page - A page that contains the order list.

product list - A list of products in the online catalog. Typically, the product list contains each product's name, price, and a very brief description. It is linked to more detailed information and may also include a mechanism for adding items to the order list.

product category navigation page - A page that presents product offerings, grouped by categories such as brand or intended usage.

product description page - A page that describes a product in detail and allows the user to add the product to the order list.

store front - A point or entry to an online store. Sometimes this page is the same as the company home page (www.companyname.com). Other times it is separate (perhaps www.companyname.com/shop).

Customer Support - Supporting users before, during, and after a purchase.

Trust - Establishing trustworthiness.

Product Navigation - Enabling users to browse products easily.

Product Information - Providing the product information that users want, need, and expect.

Purchase Transaction - Providing easy means for users to purchase products.
**Customer Support**

**Provide contact information on every page**

Provide an e-mail address and/or telephone number, or a conspicuous "Contact" link to this information, on every page of the site. If resources permit, consider facilitating online chat sessions between your customers and your product experts. Many home users have a single telephone line, and online assistance allows these customers to receive assistance while remaining logged onto the Internet.

The contact opportunities you provide customers reflect the value you place on customer service, and some customers will shop elsewhere if they feel they can get better service. Specifically, customers often need to talk to product experts before placing an order, or need special assistance from a customer service representative after placing an order. Sometimes customers simply need to be reassured that there is a human presence behind the Web site. For these reasons, companies that provide contact mechanisms show increased sales (Lohse & Spiller, 1998).

When providing contact mechanisms:

- Develop a policy and strategy for responding to e-mail in a timely manner. "Timely" is defined in Web terms as "within 24 hours" or at least "by the following business day," so be sure to have the staff to support the contact mechanisms your provide. Failure to respond timely to customer inquiries breaks a promise, and so is worse than failure to provide a means of contact.
- Indicate the geographic scope of toll-free phone numbers.
- Provide an additional phone number for international customers.
- Provide 24 hour assistance if at all possible. Otherwise, include the hours of operation, with the time zone specified. Note that "weekend" does not mean Saturday and Sunday in all countries.
- Include the languages understood by your support staff, otherwise international customers may assume your staff understands their native languages.
- Avoid presenting long, tedious lists of contact addresses and telephone numbers that users must wade through.
- Advise users not to include credit card numbers and other personal data in e-mail messages.

Tip: If you find that many of your customers ask the same questions, include answers to these questions on your site, or make the needed information more prominent on your site.

**Provide assistance when users have forgotten their passwords**

When users forget their passwords and/or IDs, provide immediate assistance via the Web if at all possible. Use other media, such as telephone, or postal mail, if you need to increase security. E-mail delivery, while not as secure as telephone or postal mail, may be more secure than Web delivery.

One way of helping users remember passwords is to ask them to create password hints when they register with the site. For instance, if a password is the name of a user's cat, that user can store a hint such as "my cat's name." The site then displays this hint when the user cannot recall the password. Password hints can allow users to complete their purchases without further delay or embarassment.

Tip: On sites in which users cannot see each other's IDs, consider allowing e-mail addresses as user IDs. People with common names may experience difficulty creating and remembering a unique user ID. John Smith, for instance, may be jsmith on one site, johnsmith on another site, johnsmith1 on another site, et cetera. E-mail addresses are unique identifiers, and most users have theirs remembered. Provide an easy way for users to change their IDs easily, especially if registrants use e-mail addresses, which are subject to change.

**Provide clear and informative error messages**

Anticipate errors that may occur, and provide clear explanations and instructions for resolving these problems. Providing helpful error messages enables users to resolve problems quickly and increases their satisfaction with your site.

Provide helpful error messages for:

- Incomplete and incorrect information in forms
- Requests for documents that do not exist
- No documents found matching a search request

Always state the problem without placing blame, and provide a polite, helpful suggestion for correcting the problem. For
instance, if a user requests a document that does not exist in the domain, the following message could appear: Our apologies. . . The document you have requested does not exist on this system. Please check the URL and try again or use our search function to find the information you are looking for. If you believe you have received this message in error, please use the Contact link on this page to report this error. Avoid cryptic, rude messages like "Error 404".

Also offer a choice of mechanisms for resolving the problem. For search errors you can provide search tips, a link to an alphabetical listing of products, and a list of some of the most popular products/pages on the site.

**Address users' frequently asked questions**

Provide easy-to-find answers to common questions so that customers can complete their tasks quickly and easily. Addressing their questions reduces customer service costs and helps establish trustworthiness (Cheskin Research & Studio Archetype/Sapient, 1999).

The following are questions applicable to all e-commerce sites:

- Is it safe to use my credit card?
- Which credit cards do you accept?
- What will you do with my personal information, such as my name and addresses?
- What forms of payment do you accept?
- How much do you charge for shipping? And do you ship overseas?
- When should I receive my product(s)?
- Can I return something I buy online? If yes, what procedures do I follow?
- What do I do if I have forgotten my account password?
- How do I order online?
- What are my other options for ordering products?
- Whom do I call if I need assistance?
- What taxes, if any, do I have to pay on the merchandise?

Also address product-related questions that your users may have. For instance, users of travel sites may want to know if they can make a reservation now and pay later.

Address important questions immediately or at the point of need. Many users will consciously or subconsciously want reassurance about security before they begin shopping and before providing their credit card information. Address this concern at the point of need by providing a brief message such as "Guaranteed Secure" on key pages, and link from the message to more detailed security information.

Also provide easy access to frequently asked questions (FAQs) from all shopping pages. With the FAQs format, different users can receive answers to many different questions in one location. They also may feel more inclined to use the information than they would if it were found in a section called "Help." (Many people are reluctant to ask for help.) Remember that new users may be unfamiliar with the concept of FAQs, and explain this term when providing the link.

**Provide simple definitions and explanations of important terms**

Define and explain important terms so users can educate themselves about your products and services. For instance, sites that sell computers need to define and explain the significance of terms like MHz, GB, and RAM. Sites that sell audio equipment will need to define and explain the significance of terms like digital outputs and oversampling.

Some terms can be defined in FAQs or other types of assistance, but explanations are most effective when provided in context as users need them. Provide an explanation or link to one wherever each important term is used.

**Provide product selection assistance**

Assist customers in selecting the product(s) that best meets their individual needs. One method is to provide a system that identifies users' goals, and recommends products based on these goals. Such a system could ask users a series of questions designed to elicit their requirements, and based on their input identify the products that best meet their needs. This technique can serve to educate or remind users about the issues they need to consider when making a purchase decision.

When designing an assistant,

- Make the purchase assistance optional (i.e. enable users to browse product categories)
- Ensure that the recommended products are the ones that best meet the customer's needs
- Avoid limiting the users' choices unnecessarily or making arbitrary recommendations
- Enable customers to rate/rank the importance of product attributes as a means to solve contradictory or incompatible requirements
- Enable users to change their answers or specifications
Enable users to skip input categories that are not important to them
• Reveal the logic of the product recommendation as users are responding to the questions
• Enable users to compare recommended products side-by-side

Note: Don't waste users' time or mislead them by providing a tool that gives bad recommendations. Test product selection assistance with users to ensure that its recommendations are appropriate.

Provide assistance to guide users through multiple step processes

Provide immediate and detailed user assistance to guide customers through multiple-step processes such as purchasing products. Providing this assistance demonstrates professionalism and commitment to meeting the needs of customers, which in turn contribute to trustworthiness. Since shoppers are more likely to buy from sites they trust, effective user assistance can have a positive impact on sales.

Know and understand the user assistance mechanisms that are available to you. Below are some different types of "just-in-time" assistance, made available when and where users need it:

• Inline text--text embedded in an interface that defines an interface object or that provides details about a task or action
• Inline messages--messages that display automatically to provide information to users about system errors or processing status
• Hover help--messages that "pop up" when the mouse pointer pauses over interface objects such as buttons, checkboxes, and fields, to provide additional information about these objects
• Multi-step assistance tools--a tool that automatically completes tasks based on information gathered from users

The table below suggests some mechanisms appropriate for different situations.

<table>
<thead>
<tr>
<th>User Assistance Mechanisms</th>
<th>Situations That Call for User Assistance:</th>
<th>Possible Mechanism(s) for Each Situation:</th>
</tr>
</thead>
<tbody>
<tr>
<td></td>
<td>Informing users of the different alternatives they have for ordering products (i.e. via phone, mail order, fax, online, or at a store)</td>
<td>Inline text and a separate section for &quot;How To Order&quot;</td>
</tr>
<tr>
<td></td>
<td>Instructing users how to search for and order products online</td>
<td>Inline text and a separate section for &quot;How To Order&quot;</td>
</tr>
<tr>
<td></td>
<td>Assisting users in choosing the product that best meets their needs</td>
<td>A tool in which users answer questions about their needs and receive product recommendations</td>
</tr>
<tr>
<td></td>
<td>Explaining how shipping charges are calculated</td>
<td>Inline text and a separate section in &quot;How To Order&quot;</td>
</tr>
<tr>
<td></td>
<td>Defining and explaining the significance of product features and specifications</td>
<td>Inline text and/or an explanation users can link to</td>
</tr>
<tr>
<td></td>
<td>Explaining the purpose of steps in the shopping and purchase process</td>
<td>Inline text and a separate section for &quot;How To Order&quot;</td>
</tr>
<tr>
<td></td>
<td>Indicating that form fields were left unanswered</td>
<td>Inline messages</td>
</tr>
<tr>
<td></td>
<td>Defining and explaining the labels for site sections and product categories</td>
<td>Hover help and inline text</td>
</tr>
</tbody>
</table>

In many situations described above, you may want to provide two types of user assistance: just-in-time assistance, and links to more detailed information.

Provide shipping information

Provide shipping information that includes the following:

• Cost and delivery time for each shipping option
• An estimated delivery date for the order
• An indication of which countries you ship to
• An explanation of international shipping options (if applicable) and delays that may be caused by customs

Establishing clear expectations about shipping practices, and then meeting those expectations, will help you satisfy your customers.

Include the detailed shipping information in the customer service section of your site. Provide links directly to this information from product description pages. Users often want to know when they can expect to receive a product when they are
considering ordering it.

**Provide mechanisms that allow users to monitor the status of orders**

Enable users to determine the date the order was or will be shipped, and provide a means of tracking the order once it is shipped. Ideally, facilitate tracking orders on your own site. Customers who can easily follow shipping status through your Web site may not need the assistance of your customer service department.

Alternatively, provide customers a direct link to the page of the shipper's Web site that displays the status of their order. Enable your customer service representatives to monitor shipping status so that they can answer customers' inquiries completely without referring them to another source.

Tip: When displaying shipping dates, use the full name or its abbreviation for each month. For example, use "February 3, 2000" or "Feb 3, 2000" instead of "2/3/2000," because some countries place the month first, and others place the day first. Users may not know whether 2/3/2000 means February 3 or March 2.

**Provide an easy means to change submitted orders**

Allow customers to change and cancel an order before it has been shipped. Making this task easy creates a more positive user experience and helps customers feel freer to order products from your site in the future.

To facilitate changing orders:

- Provide customers with an order or confirmation number as feedback that their order has been received and instruct them to use it to change an order
- Allow customers to change orders via the Web site and a toll-free phone number
- Enable customers to change an order by replying to the sender of the email confirmation, but instruct users not to send credit card numbers via email since email is not secure
- Enable customers to find and change their order using any one of the following: a confirmation number, a credit card number (transmitted via a secure server), and a user account number

**State clearly andprominently all terms and conditions related to customer transactions**

Provide all terms and conditions relevant to purchasing, leasing, returning, and servicing products so that users know what to expect. If users develop accurate expectations, they are more likely to be satisfied. This practice can help meet legal obligations in addition to increasing customer ease and comfort.

When applicable, explain the policy for the following:

- Warranties and service agreements
- Satisfaction guarantees
- Technical support
- Returns and exchanges
- Leasing terms and conditions
- Payment plans

Indicate the applicability of all terms and conditions to international customers. Become familiar with applicable international law, as some countries have laws that may override parts of your terms and conditions.

This information can appear in a section of the site designated for customer service information, or it can appear in product information. Users need access to the information before adding an item to the order list and checking out. Avoid legal jargon; provide this information in simple language so that users can read it easily.

**Provide customizable shopping lists if your users routinely buy the same items**

Enable users to maintain their own customized, editable shopping lists for routine purchases. These lists facilitate and thereby encourage repeat purchases, as customers do not have to find all over again the same items that they bought last time. Businesses for which a customizable shopping list might be appropriate include online grocers, five-and-dimes, and office supply stores.

The shopping list feature should enable each user to:

- Create multiple shopping lists
- Create a shopping list at any point in the shopping process
- Link to the product description page of each product in the shopping list
- Edit each shopping list to place a current order, updating which items they want and the quantity desired of each item
Provide registered customers access to information on their previous purchases

Provide an option that allows registered customers to save and view their order history. Allowing customers to see their previous purchases is a valuable service that can reduce customer service costs. For example, a customer may want information about items they have bought in the past to help them select complementary items, or to remind them what size they need. Access to this information can increase customers’ comfort and thereby encourage further purchases.

However, because some customers will feel uncomfortable knowing you are keeping information about them, order histories should not be saved by default. Keep a purchase history only for those customers who have registered with your site and have requested this service.

Trust

Provide access to a privacy policy from every page, and highlight it whenever users give personal information

Develop a policy explaining how you use customers’ personal information, and provide access to the policy on every page. Display the link to the policy statement very prominently wherever users provide personal information. Access to this policy helps engender trust, especially if your policy is to never share a customer's personal information with other organizations without that customer's permission.

Include the following types of information in your privacy policy statement:

- what information is gathered/tracked
- how the information is used
- with whom the information is shared

Explain the benefits users receive from sharing personal information

When asking users to provide personal information, explain how sharing this information will benefit them. For example, if you prompt users with an opportunity to register with the site, be sure you explain the advantages registration offers, such as personalized content, reduced prices, fast-path purchasing, or a record of previous purchases. Present the explanation of the users’ benefits, or at least a link to it, wherever and whenever you ask for personal information. Users will feel more inclined to provide information if the advantage in doing so is clear.

Provide mechanisms for controlling how personal information is used

Enable users to control how their personal information is used, and to change their preferences at any time. Provide this control whenever and wherever users provide personal information. Specifically, enable users to control:

- whether this information is shared with other companies
- whether they receive updates about products they have bought from your company
- the medium or media through which they would prefer to be contacted about promotional offers (e.g. phone, e-mail, and/or postal mail)
- whether they receive promotional information and offers from your company

Providing this control engenders trust and increases customer satisfaction.

Be sure that the control mechanism you give users is consistent with your overall privacy policy. For instance, don’t tell users in your privacy policy that you NEVER share their personal information with other companies, and then elsewhere ask them if you can share it.

Use a secure Web server to collect customer data and complete transactions

Use secure servers wherever you collect personal information such as addresses and credit card numbers. Secure servers are essential to meeting customers' expectations for security and to establishing trustworthiness. If a site does not use a secure server to collect personal information, then many users will shop elsewhere. Also, collecting sensitive information via an insecure server may expose your company to litigation.

Communicate that ordering online is secure

Inform users that transactions on your site are secure. Below are some good strategies:
• Provide third-party validations of security, such as from VeriSign™ (Cheskin Research & Studio Archetype/Sapient, 1999)
• Guarantee that customers will not be held responsible for paying unauthorized charges that appear on their accounts as a result of shopping at your site
• Use encryption and explain that purchase data are encrypted and thus securely transmitted

Questions about security may arise at different points in the shopping process. For this reason, include brief security statements on appropriate pages, such as the store front, order list page (or shopping cart), and order form page. Display a simple phrase such as “Guaranteed Secure” that links to more detailed information on a page specifically about security and privacy.

**Display endorsements and affiliations that create a feeling of trust and security**

To increase the credibility of your site and products, display validations from third-party sources. One type of validation is Web-based seals of approval for security and privacy, such as VeriSign™ and TRUSTe. Research shows that these seals help establish trustworthiness (Cheskin Research & Studio Archetype/Sapient, 1999). Similarly, product validations, such as third-party reviews, product awards and honors, and customer testimonials, are useful in communicating the quality of your products.

Third-party validations are important for all sites, but particularly for companies and sites that are lesser known. Shoppers are wary of doing business with companies they do not know, and third-party validations add legitimacy and credibility to your site and products.

When citing endorsements and affiliations,

• Display seals, awards, and third-party validations that your users recognize and trust
• Republish articles, press clips, etc. from third-party sources on your own site so that users do not have to leave your site to read them before completing a purchase (make sure you receive permission from the original source)
• Provide links to the original article (if there is an online copy from the original source) so that users can verify its legitimacy and read the full article
• Avoid randomly littering pages with seals and links to reviews; rather display seals in a consistent location, and neatly group links to reviews and awards

**Provide background on your company**

Provide a company history and brief mission statement to help establish credibility. Shoppers want to do their online business with companies they can trust, and they are more likely to trust a company they know something about.

Providing this information is particularly important for sites of lesser known companies that need to create a feeling of trust. It also introduces prospective employees and investors to your company.

Provide the company history in the “About _____” (“About IBM”, “About Acme”, etc.) section of your site. In the history or mission statement, emphasize the value you offer your customers. Some sites emphasize their commitment to quality, and some sites/companies emphasize their innovativeness. Project the image that you want to project and that fits with your business plan.

**Product Navigation**

**Provide fast, easy paths from the store front to detailed product information**

Enable users to navigate from the store front to product description pages as efficiently as possible. Users are sometimes disappointed by how long it takes them to accomplish this task (IBM Ease of Use, 1998; Jarvenpaa & Todd, 1996, 1997). If users are frustrated in their attempts to navigate to the product, they may give up and go elsewhere. To meet users’ needs, eliminate any unnecessary steps or pages on the path between the store front and product description pages.

Determine users’ satisfaction with each step in the navigation/shopping process. Specifically, during iterative design and development, ask representative users what they want and expect before they follow each link. Then ask them to rate how well each resulting page meets their wishes and expectations. Also obtain ratings for their overall satisfaction with the site’s navigation structure and mechanisms. By learning users’ expectations, you will learn how to organize your site to meet their needs.
Provide different site paths to facilitate different shopping strategies
Enable your users to accomplish their goals using strategies they prefer. Different users employ different shopping strategies. For example, to determine which product they want to buy, some users will want to use search; others will want to browse product categories, and still others would like you to recommend products for them. Sites that accommodate their users' strategies are more likely to succeed than those that force users to learn new strategies.

You will need to learn from your users the strategies that your site should support. Analyze representative users' strategies as they shop, both in physical stores and online. Web sites should support strategies that customers use in physical stores, such as seeking assistance from a sales clerk or product expert. Sites should also try to improve upon the resources available in real stores, so that users can apply their strategies more easily. For instance, to facilitate price comparisons and offer the best price, sites can immediately update prices to compete with the competition.

Provide links to shopping pages from a variety of other pages and sites
To increase traffic and sales, provide links to your shopping pages from other pages and other sites (Lohse & Spiller, 1998). Make arrangements with other sites, such as Web site portals, to link to your shopping pages. Incentives, such as finders’ fees or percentages of resulting sales, can encourage other organizations to link to your shopping pages.

You can also increase traffic and sales from within your site by increasing the number of links to shopping pages from other pages in your site. For instance, you can link from an announcement of the release of a new product in the News section to the product's description page in your shopping pages.

Links to shopping pages should take users to pages they want and expect to see. In other words, if a feature article discusses Widget X, a useful link would take users to the product description page that discusses Widget X rather than to a registration page for widget shoppers.

Provide shortcuts to the most popular products
Provide a list of shortcut links to your best-selling items and/or those that users most frequently navigate to. Shortcuts minimize the time and effort users spend navigating, allowing users to bypass the site's hierarchy. Shortcuts can also show users the products that other people are buying.

The list of shortcut links can appear on the store front or on product category navigation pages. Alternatively, you can provide a single link to a separate page that lists shortcuts. You can call these links "Shortcuts" or, where appropriate, “Best Sellers.”

Display products simultaneously to facilitate comparison
Enable users to view products simultaneously to compare specifications and features. Shoppers commonly compare products to help them identify the product that best meets their needs. Sites that simplify comparing products, therefore, also simplify and encourage purchasing products.

Since comparison is fundamental in the shopping process, facilitate comparison within all the major paths through your shopping pages. For instance, enable users to compare products and initiate more detailed comparisons while browsing product categories. Also facilitate comparison after users specify requirements and receive a list of recommended products. Optionally, you may also want to designate an area of your site specifically for product comparisons.

There are many ways to support comparisons. To help shoppers compare products with numerous features or specifications, such as computers, home theater equipment, or automobiles, a table of features and specifications may be appropriate. Products such as clothing or home decorating items, for which appearance is important, may be compared meaningfully using pictures with text descriptions. Support comparison of the most important differentiators for the specific product type.

Give users control over which products they compare
Let users control which products they view simultaneously, since you cannot easily predict their choices. Allow them to select products for comparison whether they are navigating through product categories or visiting any area of your site designated specifically for comparison.

Provide users enough information to decide which products they want to compare before adding them to the comparison. Minimally, users will want the name of the product, the price, and at least two or three important specifications or identifying features. Product numbers and brand/model names typically do not provide enough information for users to decide if they want to view the product in a comparison. Learn from your users what information they need for making this decision.

Provide easily navigable and enticing product lists
Make it easy for users to scan and select products in lists, and entice them to examine products more closely. Lohse and Spiller (1998) found a positive correlation between effective product lists and increased sales.
To create navigable and enticing product lists,

- Include helpful information, such as prices, thumbnail images, product descriptions, and promotions, to encourage users to explore products in more detail
- Enable users to view at least three or four items simultaneously
- Strike a balance between the number of items users can view simultaneously and the amount of information you provide for each item
- Present items in a logical order (e.g., alphabetically, by common features, by release date, etc.)
- Present related products in logical groups within the list
- Require only one click to view more detail about a product
- If your customers sometimes know which product they want without viewing the product description page, provide a mechanism on the product list for adding items to the order list
- Ensure that the product list loads quickly and conforms to your performance requirements

Since product lists are very important, base their design on customer input. Specifically, ask representative users to rank product features in order of their importance in the buying decision process. Include the most important characteristics in your product lists, and reserve the additional information for product description pages. To determine the appropriate level of detail, create prototypes featuring varying amounts of information and test them with representative users.

Tip: If space permits, list all products in the body of the list rather than in dropdown lists. Dropdown lists hide items and require at least two clicks for viewing an item. In an IBM study of two clothing sites, participants preferred a product list in which all items were visible to one that used dropdown lists (IBM Ease of Use, 1998).

Enable users to browse sequentially through product descriptions within categories

On all product description pages, provide links such as forward and back arrows that enable users to see another product in the same category with only one click. These links enable users to view multiple products quickly and easily, without having to navigate repeatedly up and down a catalog hierarchy.

Support easy navigation between the order list and other shopping pages

Include on each of the shopping pages in your site a link to the order list page, often referred to as the shopping cart. Similarly, include links on the order list page that enable users to "continue shopping." "Continue shopping" links communicate that items will be saved in the order list while users shop for additional items, and many users want this reassurance.

Since the destination of a link labeled "Continue Shopping" is not explicit, you may want to provide a dropdown list of links with "Continue Shopping" as the field label. Include in the list the last page the user visited. Also include links to the other main shopping sections, or better yet, customize the list of links based on each user's shopping history and/or expressed interests. Users may be more inclined to shop for and buy additional items if they are not required to return to the top of the product hierarchy and drill down again (IBM Ease of Use, 1998).

Product Information

Offer a range of products that meets users' expectations

Offer the same variety of products on your Web site as you carry in brick-and-mortar stores or paper catalogs. Customers value Web shopping partly because of the vast variety and selection of products. They are disappointed if companies do not offer their complete catalog of products online (Jarvenpaa & Todd, 1996, 1997).

Provide pictures of all physical merchandise

Provide pictures to attract users' attention, help them identify products, help them understand a product's features, and help them feel more knowledgeable and comfortable when making purchase decisions. For sites that sell thousands of products, providing pictures of all of them requires a significant investment. But pictures are vital to e-commerce because the Web is largely a visual medium in which customers cannot feel, touch, or hold products. Pictures must provide the marketing appeal that packaging and product displays provide in brick-and-mortar stores.

Because large pictures cause slower downloading, consider presenting "thumbnail" photos initially and linking to larger views of the same items. In both thumbnail and larger pictures, make the product features as distinguishable as possible. Provide pictures from different angles, and enable users to click for a larger view if these additional views assist users in understanding the product and its features.
Provide information about availability

Provide information on your product description pages about the availability of each product, and immediately update the information when the inventory changes. If possible, indicate exactly when you can ship the product. For instance, you may want to say something like "Ships within 24 hours of receiving your order" or "Orders received by 1:00 pm Eastern time ship the same day" (but be sure you keep your promises). Link to information about shipping options so that the user can estimate a delivery date.

Fast, reliable service is an important selling point. The more specific and accurate your shipping times, and the more rapidly you fulfill orders, the more likely you are to please your customers.

Tip: Avoid using the term "shipping time" because it's unclear. Business typically use it to refer to processing time, but customers sometimes think it means they will receive the product in that time.

Display prices prominently

Include prices on your product description pages and, in most cases, in your product lists. Price is one of the most important product attributes affecting the purchase decision, so do not require users to "dig" for prices.

Note: Use the three-letter international currency symbol (e.g. USD for US dollars) and a descriptive phrase (e.g. "All amounts are in US dollars.") to explicitly indicate the currency base.

Provide detailed product information

Provide detailed specifications and/or descriptions of the physical characteristics, features, and functions of products. This detailed information is essential to Web shoppers because they do not have the assistance of sales clerks, and cannot touch products as they might in brick-and-mortar stores.

To provide effective product information, develop a thorough understanding of your customers and their interests and needs. Once you have a clear understanding of your users' needs, design your product information to address those needs.

Note: If you are selling to an international audience, use both the metric system and the imperial system to specify product dimensions.

Disclose the most important product information first

Whenever products and product categories are introduced, begin each product description with information that distinguishes that product from others and enables customers to recognize quickly which products do and don't meet their needs. The product descriptions, whether they appear on the store front, on product category navigation pages, or on product description pages, should answer the following questions:

- What is the product for?
- Who is the product for?
- What are the product's distinguishing characteristics?
- What are the reasons for buying the product?

If users can discern this information immediately, they can quickly navigate to products that closely match their needs or interests.

Display unintrusive promotions on key pages

Display promotions, such as price reductions, rebate offers, interest-free financing, and special new offerings, on your store front and product category navigation pages. The promotions should briefly describe each offer and link to more information and/or the specific product being promoted.

Promotions are effective when they inform users of special opportunities without interrupting an enjoyable shopping experience. Information on a "good deal" or a new product may be the extra incentive that some users need to complete a purchase. To avoid distracting and annoying users with promotions,

- Reserve primary screen real estate to main product categories and the search engine
- Locate promotions in a consistent place on each page
- Display promotions that are relevant to the product category that the user is currently viewing (i.e., vary promotions according to the category the user is viewing)
- Avoid displaying promotions where they would distract the user from a task that requires a high level of concentration, such as a comparison page with detailed product information
- Do not display an overwhelming number of promotions on the store front or product category navigation pages; rather,
display one or two and enable users to click for more promotions

Also specify when and where promotions are valid, and immediately remove them when they have expired.

Tip: You may also want to provide “appetizers,” such as free downloads and contests to win free products. Appetizers induce people to visit your site and whet their desire to buy products. Be sure to link to shopping pages from the appetizers. For instance, a page where users register to enter a contest should link to the product that the winner will receive, to that category of products, and to the store front.

Facilitate cross-selling and up-selling without annoying or distracting users

Use cross-selling and up-selling techniques to provide customers easy access to products they may want or need. Cross-selling consists of displaying or linking to products related to the one(s) the user is currently viewing. Up-selling consists of displaying or linking to a more expensive alternative to the one the customer has chosen.

Before trying either strategy, ensure that cross-selling and up-selling will benefit your customers. Cross-selling is beneficial when it provides your users an easy way to buy additional products that they need or want. For instance, if users have added a notebook computer to their order list, they may welcome a link that allows them to shop for a carrying case and other accessories. Up-selling can help users understand what is available at the next price level, and how much the additional function or quality would cost.

When designing a page that uses cross-selling or up-selling, devote primary screen real estate to the product the customer is viewing, or the user's primary task. Ensure that cross-selling and up-selling options do not interfere with users' ability to complete their current purchase.

Purchase Transaction

Provide an order list page that supports reviewing, editing, and submitting an order

On the order list page, often referred to as the shopping cart, provide the following information and functionality:

- Total cost, which is the sum of the price of each item, plus taxes, plus shipping and handling, plus any other charges
- Itemized costs, which is a list of all the costs that contribute to the total cost
- Product names and/or descriptions that users will understand
- A link from the name/description of each item to its product description page
- A mechanism for removing individual items
- A mechanism for changing the quantity to be ordered of each item
- A mechanism for initiating the purchase process (a link to the order form)
- An option to save the order for completion later, or information on how long it will automatically be saved
- A link to a detailed explanation of shipping charges

You may also want to:

- Include the shipping charges for each item, particularly if shipping charges are expensive and they vary from item to item, so that users can understand the shipping costs and act to reduce the costs
- Facilitate changing option choices, such as size or color
- Provide the option of adding accessories, such as batteries, while not interfering with the users' main tasks

Provide at least two forms of confirmation that the order has been received

To inform users that their order has been received, provide confirmation via the Web and at least one other medium (typically e-mail). The confirmation page should include a list of the items ordered, a confirmation number so that customers can track and cancel orders, and information about when users can expect to receive the order.

In addition to the confirmation page, many sites also provide e-mail confirmation. The e-mail confirmation provides a list of the items ordered as well as a confirmation number. It also provides a record of the transaction for those users who do not print the confirmation Web page. You may want to allow users to pick the method of confirmation. Airlines, for instance, often ask customers if they want their itineraries sent by fax, e-mail, and/or postal mail.

Tip: On the confirmation page, you may want to ask users if they would like to register with your site, if they haven't already. Emphasize that they have already provided all the personal information they need to provide. They only need to choose an ID and password. (Remember that saving credit card information should be optional.) Also indicate the advantages registration
offers, and link to or communicate your privacy policy.

**Provide mechanisms for fast-path purchasing**

Provide shortcuts that speed the purchasing process. One method is to use information previously supplied by the user during site user registration, such as their billing and shipping addresses. When these registered users want to buy products, they do not need to enter this information again. Instead, they provide access information, such as a user ID and password, and a credit card number, and the site provides the additional information to complete the order.

One potential problem with fast-path purchasing is that a user may sometimes need to send products to a different address from that saved in his or her account information. Possible solutions include directing users to the standard checkout path, or (with additional security checks such as re-entry of a password) allowing them to enter an alternate shipping address.

**Make the order form as simple and brief as possible**

Ask users to provide only that information that is necessary to complete a purchase or meet a customer need. If you ask users to provide unnecessary information, or your purchase forms appear in any way cumbersome, you will discourage purchases.

If a product is to be shipped to a customer, request and provide the following information on the order form of non-registered customers:

- Billing address
- Shipping address, if different from the billing address
- Credit card data or equivalent purchase information
- Shipping preference (i.e. 2-3 day vs. overnight)
- A very brief statement about the security of the transaction, with the option to link to more detailed information
- Access to information on privacy

In addition, you may also want to provide your customers an opportunity to enter a coupon or gift certificate number and/or to send the item(s) as a gift (omit prices, wrap the item(s), and write a message to the recipient). If you provide these additional services, include them on a separate, optional link from the order form so that they do not clutter the standard form.

**Provide alternative methods for ordering products**

Provide alternatives to online ordering. The most universally available and quickest alternative is a toll-free phone number and an additional number for international customers. You may also want to provide fax numbers and postal addresses.

Some customers are reluctant to provide credit card numbers online, and other customers want additional information before completing an order. With a phone number, customers can resolve their questions and then provide their order information in the same call.

When providing alternative means for ordering,

- Make it easy for customers to find the phone number they need
- Indicate the geographic scope of all phone numbers
- For international customers, provide an additional phone number, indicate the hours you support it (international audiences may need a number that is answered 24 hours a day since they are in different time zones), and indicate the languages understood by the support staff
- Make sure you have the staff to support the phone numbers you provide
- Advise users not to include credit card numbers and other personal data in e-mail messages

**Enable users to change an order at any point prior to submitting it**

Enable users to make changes to information they have entered, wherever the information appears, at any point and time prior to submitting the order. Users sometimes want or need to change product specifications they have entered, such as the size or color of a shirt. In these situations, the more easily they can change the order, the more likely they are to complete the purchase.

To facilitate reviewing and changing orders:

- Provide a link to the order list page from the order form pages
- Support the essential order list tasks discussed in the “Provide an order list. . .” guideline above
- Preserve state when users leave the order form pages to review or change their order (i.e., don’t require users to “start over” when they return)
Update the order list and order form pages immediately when users change product specification choices

Bibliography


