



Designing and Building the Project

Introduction

In Chapter 2 we looked at the initial phase of development: planning. Now in Chapter 3 we consider the rest of the development process: the design and building phases. At the end of the chapter, we turn from the process to the people and the skills needed to design a website. Figure 3.1 (repeated from Chapter 2) summarizes the complete development process.

Broadly speaking, the development process proceeds from planning to design to building as shown in Figure 3.2. The figure also shows that the progression is not a simple straight line from start to finish, but rather a fluid process with significant blending among the phases. We can see that there is building in the design phase and design still to be done in the building phase. The Planning bar at the top of the figure shows the continuation of planning tasks throughout the project. For example, you need to monitor the schedule on a regular basis and deal with any unexpected problems such as someone leaving the project. The Evaluation bar at the bottom of the figure shows that evaluation tasks are performed throughout the project and that poor results may force you to loop back (the dotted lines) to an earlier phase of the project. Some projects include large and complex components, such as a video sequence, that are best regarded as partially independent sub-projects with their own planning, design, and building phases.

Let's turn now to the design phase. Note that while the development process presented in this book applies to all information structures, our explanation generally assumes a hierarchical website. We do this because, without a doubt, the great majority of all the websites on the World Wide Web are fundamentally hierarchical.

Planning	Design	Building
Formulating your purpose	Advancing the content list	Setting up the work environment
Analyzing and adapting to your audience	Working out the structure	Developing, revising, and reviewing content
Reviewing other websites	Creating design sketches and sample pages	Coding special features
Choosing a business model	Designing for change and future development	QA (quality assurance) testing
Establishing working relationships with the appropriate people	Building a prototype	Project documentation and reporting: The completion report
Determining and dealing with project constraints	Evaluation—especially user testing	Post-release evaluation
Establishing a theme and style—plus concept sketches	Project documentation and reporting: The design report	
Planning content and content acquisition		
Planning for ample evaluation and performing early evaluations		
Project documentation and reporting: The planning report		

Figure 3.1. A summary of the complete Web development process.

The Design Phase

In the design phase you draw upon all the thinking you did in the planning phase. But now you are thinking in concrete terms about the particular pages that will make up your website. You need to make considerable progress along several fronts:

- *Content.* You will need a much fuller understanding of the eventual content of the website than what your content list shows you. You don't create many of the graphics or write most of the pages, but you need a fairly good idea of what topics the website will cover, the level of detail, and what content types you will be using.

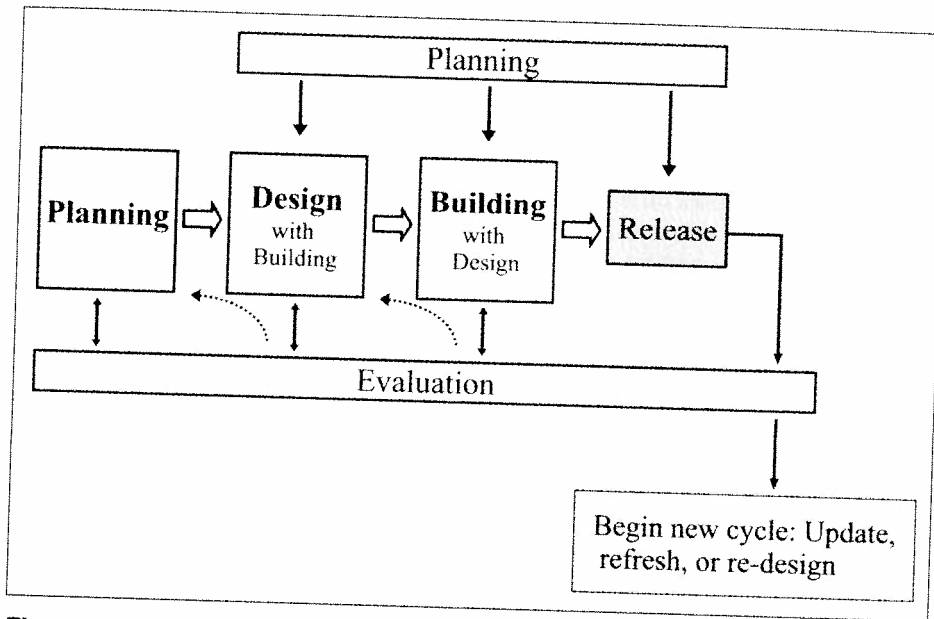


Figure 3.2. A model of the Web development process.

- *Structure.* You need to know how the pages fit together into a well-organized structure. You don't need to know how every page will be linked, but you do need to know the main branches of your hierarchy and the other major links. Without this broad understanding of the linking, you can't move from concept sketches to true design sketches. Why? Because the buttons and other links are a major part of the page design.
- *Appearance.* You need a good idea of what the pages will look like, starting with the home page but including "interior" pages as well. You should think through color schemes and the different page layouts, including the general appearance and placement of the links.

A very important part of the design phase is creating sample pages and eventually a prototype—a test version of your website. With the prototype you can perform realistic tests of your design. When the prototype proves itself through evaluation, you are ready to build the website, and the design phase ends in success.

Advancing the Content List

You will want to review, expand, and refine your content list, transforming it into a list of Web pages. Are there elements that still need to be added to the list? Are there elements that no longer seem appropriate for the website?

Some of the elements on the list will need to be specified more fully. For example, the designers of the City of Centerville website listed city council information

on their early content list. In the design phase, they realize that this one item is very broad and should be the basis for several Web pages—a page describing the make-up of the council and council procedures, a page for each member of the council, a page listing the agenda of the next meeting, and so forth.

If your plans call for hiring an artist, photographer, or other content creator, this is a good time to make the arrangements. You will probably want to talk with several candidates, examine their work samples, and negotiate the schedule, cost, and other matters.

Working Out the Structure

Now you must organize the items on your expanded content list. You need to think about your users, their information needs, and the pathways you need to provide to enable them to navigate the website efficiently. Often entirely new ideas for the website come to mind as you work out the structure.

Although the design for the website's structure can conceivably reside in someone's head, this is a bad plan. Even in small projects it is very desirable to devise a representation of the evolving structure. This representation provides a record of the design work that has taken place, and it's something you can study and share with others. We will consider three kinds of representations here: (1) a node-link diagram, (2) a set of note cards, and (3) an outline. We will also consider the related issue of top-down and bottom-up design.

Web development projects differ greatly in size, purpose, design, and the nature of the development effort. These differences, plus the personal preferences of individual designers, will determine which of these representations are employed and how much effort is put into each of them. As you will see, all three are valuable. They can be used very productively in combination, and there is no sequence in which they need to be employed.

One difference among Web development projects is worth noting here. Sometimes the design team has a fairly complete understanding of the overall structure at the beginning of the design phase. Perhaps this website is being added to a family of similar sites. Perhaps the content just lends itself strongly to a particular structure. For example, Annie and Peter's Points West website promises to have a relatively simple, easy-to-anticipate structure. In other projects, the structure is not well understood in advance, but must be painstakingly worked out throughout the design phase. Many projects are combinations in which certain portions are easy to organize while others are more difficult.

The Node-Link Diagram

Node-link diagrams go by a variety of names, including "structure diagram" and "navigation flowchart." You can simply sketch a node-link diagram on a sheet of paper or you can create them with drawing and flowcharting software applications, among them Inspiration (from Inspiration Software) and Visio (from Microsoft). Certain Web authoring tools generate a node-link diagram as the designer builds the pages of a website. A node-link diagram of an early version of Asthma Horizons appears as Figure 3.3.

Node-link diagrams, however you create them, are a flexible, highly intuitive means of representing a website's structure. To encode different kinds of information about your design, you can show nodes as different shapes and in different sizes. Link lines can be thick, thin, curved, dotted, and so forth. We explain more about node-link diagrams in Chapter 6, "Hypertext Theory."

Node-link diagrams do have drawbacks. First, it takes some effort to prepare and update them. If the website is really large, it may be difficult or impossible to do more than represent a portion of the website—perhaps just the first three or four levels of the hierarchy or perhaps just a portion that is presenting special navigation problems. Also, if the website is heavily linked, it is difficult or impossible to show all the linking without making the diagram look like a plate of spaghetti and meatballs. These problems can be partly alleviated by abbreviating page names and by excluding certain categories of links.

Note Cards

Note cards take the form of 3 x 5 index cards, yellow "sticky notes," or something similar. Cards, representing potential Web pages, are named or briefly described and sorted into piles representing categories. The cards are then laid out on a table or taped or pinned to a wall. It is easy to add, remove, modify, and move cards. If the cards are affixed to a large sheet of blank paper, lines representing links can be drawn between the cards. An excellent technique for organizing a website is to ask potential users to sort your cards into a hierarchy that makes sense to them. Invite them to add, discard, and re-phrase the cards.

As with node-link diagrams, it is difficult to represent more than a portion of a large website. You may find yourself looking for a very large table or wall. Another problem is retaining a permanent record of the design work that has been done. Sometimes a wall or table of note cards can be photographed.

Using the Outline Feature of a Word Processor

Very likely your word processing program includes an outline feature. When you work in outline view, you enter text using different heading levels, and the outliner formats what you've typed as indented entries in an outline. Outline entries, therefore, can represent individual Web pages. An outline view of an early version of the Asthma Horizons hierarchy is shown in Figure 3.4. (Note that "Medications and Treatments" is a second-level entry; "Short-term relief" is a third; and "Inhalers" is one of the few at the fourth level.)

The outliner offers some major advantages:

- You can represent a website consisting of hundreds of pages extending down to five or more levels.
- You can quickly add, delete, change, and move entries.
- Your keystrokes can be copied or imported into your Web authoring tool.
- You can add notes (in the form of body text) directly beneath any outline entry. For example, notice the notes under the entries "Long-term help" and "Northwest Focus." You can even include draft versions of text that will appear on a Web page.

- **Asthma Horizons**
- ✦ **Causes and Symptoms**
 - *What is asthma?*
 - *Symptoms*
 - *Asthma triggers*
 - *Testing and diagnosis*
- ✦ **Dealing with an Episode**
 - *Early warning signs*
 - ✦ *Responding to an episode*
 - = Discuss mild, moderate, and severe episodes
- ✦ **Medications and Treatments**
 - ✦ *Short-term relief*
 - *Inhalers*
 - ✦ *Long-term help*
 - = Check on long-term treatment with inhalers
 - *List of medications*
 - *Participating in drug studies*
- ✦ **Controlling Your Environment**
 - ✦ *At home*
 - = Discuss dust mites, cleansers, second-hand smoke
 - ✦ *At school*
 - *Tips for dorm life*
 - *At work*
- ✦ **Children and Teens**
 - *Childhood asthma*
 - *Asthma and teens*
- ✦ **Special Populations**
 - *Asthma and seniors*
 - *Urban populations and asthma*
 - *Minorities and asthma*
- ✦ **Public Policy**
 - *Legislature debates administering medications at school*
 - *Health insurance issues*
- ✦ **Research**
 - *Links to research studies and summaries*
- ✦ **Northwest Focus**
 - = Provide external link to stats on daily pollen count and air quality
 - *Profile: Chad Brown, Seattle Seahawk*
 - *Allergens prevalent in the Northwest*
 - *Scholarship established in honor of Dr. Jeff Altman*
 - *Update on flu vaccine availability*
 - ✦ *Regional events*
 - = Summer camps, walkathons, etc.
 - *Links to associations and support groups in the Northwest*
- **About Us**

Figure 3.4. The initial outline of Asthma Horizons Northwest.

The outliner, however, has two major drawbacks. First, it is not feasible to represent anything but a hierarchical website. Second, links cannot be explicitly represented. The levels of indentation clearly imply that there are links from one level to the next, downward links pointing from parent to child nodes. But there is no way to show the many other kinds of links (such as links across branches of the hierarchy). These are the links represented with dotted lines on the Asthma Horizons node-link diagram.

It takes several hours to learn and become comfortable with the outline feature. The outliner, however, despite its drawbacks, is an effective tool for organizing websites (as well as print documents), and so this time will prove to be an excellent investment.

Top-Down and Bottom-Up Design

Designing the structure of a website requires both top-down and bottom-up thinking. Top-down design starts with broad categories that are divided into more specific categories. In other words, a designer will come up with an idea for content, such as how to deal with an asthma episode, and will say, "What ideas might fit under here?" Then, several ideas come to mind (such as knowing the early warning signs) and the designer must decide whether these ideas will become separate pages or just sections of the Dealing with an Episode page.

Bottom-up design starts with individual Web pages, which are then grouped. For example, a designer might be looking at a note card labeled "Improving Your Environment at Home" and a card labeled "Improving Your Environment at School." She might decide to create a new card "Improving Your Environment at Work" and to group all three cards under a new general card, "Improving Your Environment at Home, School, and Work."

All three kinds of representations allow for top-down and bottom-up design, but node-link diagrams tend to favor top-down design, and note cards tend to favor bottom-up design. Outliners favor top-down or bottom-up design depending on how they are used. Given the strengths and drawbacks of these three means of representing website structure, you can see the benefit of using more than one in a project.

Creating Design Sketches and Sample Pages

Once you have worked out the structure of your website, you can begin to create design sketches and sample pages. Keep in mind that we use "sketch" to mean either a paper-and-pencil sketch or a computer rendering. Design sketches and, especially, sample pages should not be far from the final design.

In many ways this is the climax of the creative process. If you are going to get really good design ideas, this is when you want to get them. Team members should spend time working alone to see what they come up with, but there should also be extensive sharing of ideas. Teams may assign two people to work independently on a key task so the team will have two designs to look at. Often, you can make something brilliant from the best aspects of two flawed designs.

Certain implementation decisions should be made at this point. For example, you can't work out your page layout in detail without deciding what screen resolution (e.g., 800 x 600 pixels) you are designing for. If the development team is committed to avoiding certain Web techniques (such as framesets), these decisions must now be figured into the design. It is also necessary to establish a maximum acceptable file size for your Web pages, and determine how you will restrict the number, dimensions, and other characteristics of graphics (and dynamic content) to stay below that limit.

You should certainly get feedback from potential users when you create design sketches and sample pages. You can ask questions about the appeal of the overall design, how well the graphic elements fit the design, how informative the writing is, and so forth. If this feedback reveals any design flaws, you'll need to re-think the design and create new sketches and sample pages.

Let's see what the Asthma Horizons team has done, starting with the home page.

Asthma Horizons: The Home Page

Looking at the sample page shown in Figure 3.5, you immediately see that the geometric design, created as a concept sketch in the planning stage, is gone. Two

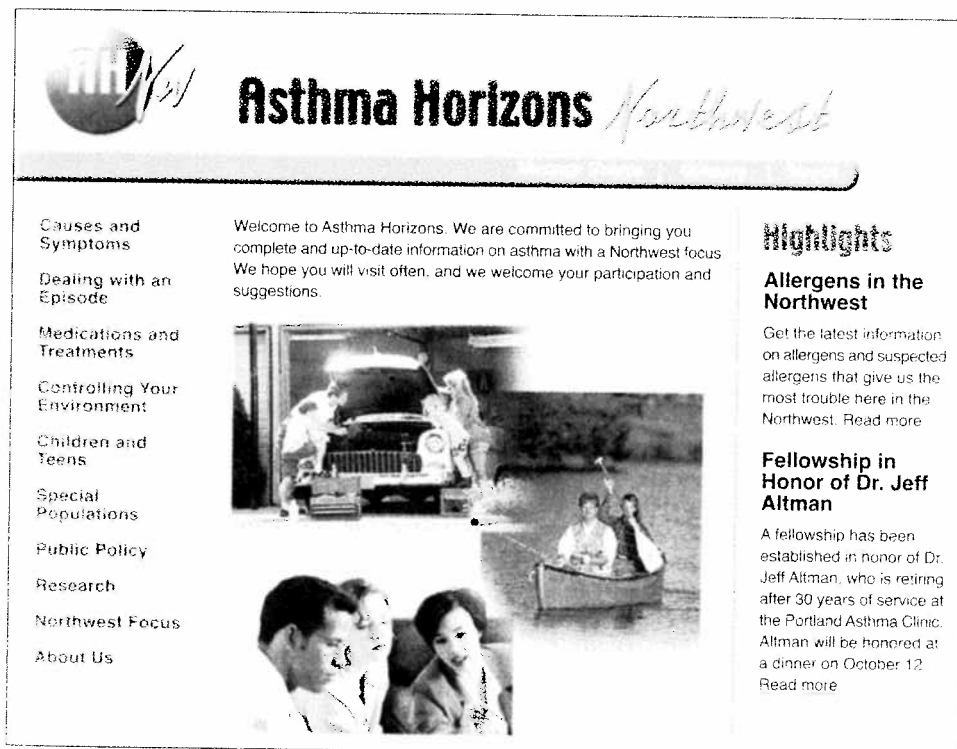


Figure 3.5. A sample page of the Asthma Horizons Northwest home page.

experienced graphic designers told the design team that the geometric design seemed somewhat cold and impersonal, hardly the look they wanted for Asthma Horizons. Nor did the various asthma patients who looked at the concept sketch respond with great enthusiasm. Furthermore, the design team decided that they wanted space for featured content on the home page.

In the new design, the name of the website, large and prominent, appears in a banner across the top of the page. At the upper left is a blue circle with the abbreviated form of "Asthma Horizons Northwest" and (at the circle's left edge) a sunburst, the only aspect of the concept sketch that has been retained. The blue circle and sunburst suggest bright skies and a hopeful future and will become the logo of the Asthma Horizons website. The background of the banner and navigation column is a sunny yellow; the bar below the banner (with the Message Boards, Glossary, and Search links at the right) is a tawny yellow.

The new design features photographs of people engaging in work and recreational activities. The photographs, licensed from stock vendors, will help express a key part of the Asthma Horizons theme: Asthma sufferers can live active, happy lives.

Asthma Horizons: The Interior Pages

After some careful thinking and discussion, the design team has reached agreement on the design of the interior pages, and they have made a combination of design sketches and sample pages at the second, third, and fourth levels of the hierarchy. One of these design sketches appears below as Figure 3.6.

Notice that the name of the website appears in the banner but in a smaller font that signals an interior page. The blue circle will appear on every page and will consistently serve as a link to the home page. The name of this page (Controlling Your Environment) appears in bright red at the top of the main content area. Below are three links to the child nodes.

The team has also worked together on the text of all of these design sketches and sample pages and has agreed upon the vocabulary level, style, and other characteristics. The design team believes that these design sketches and sample pages are highly informative and engaging and that they fit the overall design. The evaluation tasks performed so far confirm this judgment.

Working from a Grid

Grid systems are sets of horizontal and vertical lines that are almost always used in the design of print publications and have now become a key technique in Web design. The role of a grid system is to specify what variations in the basic design are permissible. Grid systems, therefore, enable designers to maintain consistency in page layout, especially when several people are designing Web pages. Once the grid has been established, any variation from the grid should be discussed. No one should informally create a new page layout for any portion of the website. Figure 3.7 shows the use of a grid system in Asthma Horizons. You can see how the various pages are variations on the same basic dimensions established by the master page.

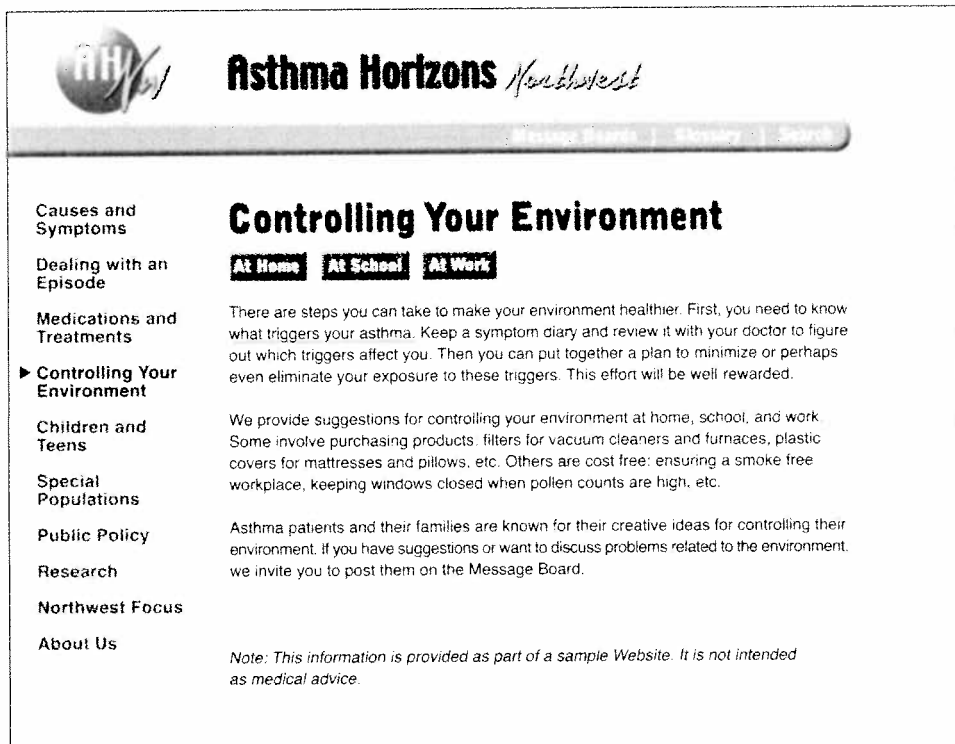


Figure 3.6. The sample second-level page Controlling Your Environment.

Closely related to grid systems are templates. A template is a computer file that incorporates grid lines and a variety of other recurring page elements such as the logo and navigation bar. Templates both enforce consistency and save time.

Designing for Change and Future Development

As you design, you need to think ahead to the long-term future of the website. CD/DVD titles are somewhat like books. Once completed, they do not change, at least not until a new version is created and distributed. On the other hand, most websites continue to change, perhaps every few months and perhaps much more often. Designers need to anticipate the various kinds of change.

When fundamental changes are likely, avoid design ideas that cannot readily accommodate such changes. Consider, for instance, a home page with links to seven main branches of a website's hierarchy. The designer has come up with a rainbow motif, with seven large links each representing one of the seven colors of the rainbow. If it proves necessary to add or drop a branch, the rainbow motif will need to be discarded.

In many other cases, the basic structure of the website is stable, but there is regular updating of content elements. For example, the website of a nightclub

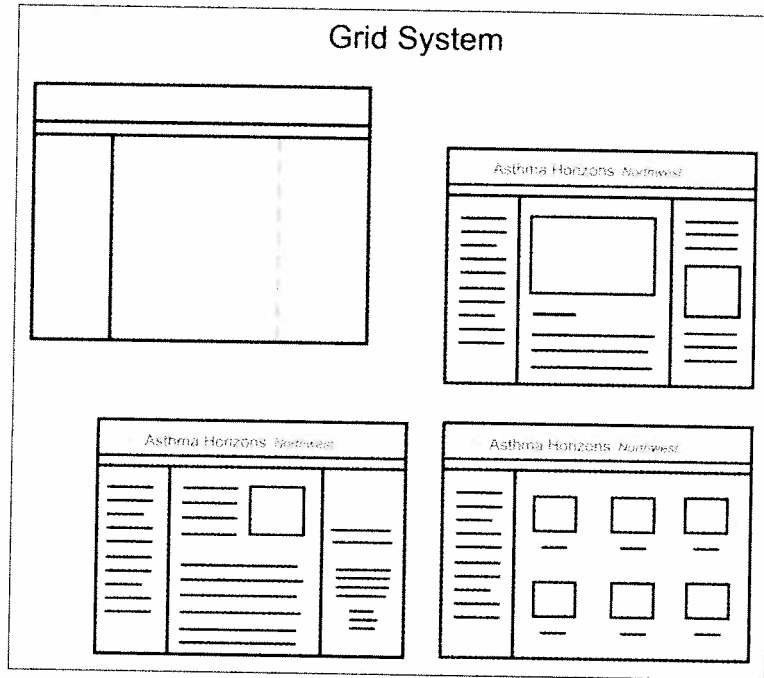


Figure 3.7. A grid system for Asthma Horizons. All pages in the website are variations on the master page.

must announce—and prominently—what band is currently playing and what band will be playing next week. Therefore, the home page must have areas set aside specifically for this frequently updated information.

Some websites, including some of the most visited websites, update their content daily or even more often. These include news sites, portals, and some online stores. There are limits to the attention that designers can give to Web pages that will disappear in 24 hours. Continual updating, therefore, requires special content-management software and a semi-automatic database-driven development process. Each day's content is "poured" into a stable template following sophisticated rules for the placement of text and graphics. Because no one will be hand-crafting the design of each day's pages, it is necessary to create an overall design that can accommodate, in a functional and attractive manner, different amounts of text and different numbers and sizes of graphics. Working out the design principles for continually updated websites is a new and intriguing aspect of Web design. For more information on content management, see www.arbortext.com, www.meta-torial.com, and www.hablador.com.

At times a different kind of problem arises: Site designers create a design that commits the site owners to more updating than they are prepared for. Don't create a category entitled "Special Monthly Feature" unless you are sure that the owners are prepared to carry out this kind of change. There are many websites whose special monthly feature is many months out of date.

As websites change, there are likely to be certain kinds of older content that remain important and should be retained and moved to an archive. For example, many corporations provide archives of past press releases, and many online magazines provide archives of past issues. Designers need to consider the ways in which visitors will be able to access the archived content. For example, will the archive be organized chronologically or by topic as well? If the website utilizes a Search feature, the archive should be part of the website's searchable content.

Another kind of change is a "refresh." A refresh changes the look of the website, possibly by changing the graphics on the home page or the color scheme. A refresh rewards regular visitors and prevents the site from seeming stale. One risk of periodic refreshes is that you need to find new design ideas that are as good as the earlier ones.

Eventually almost every website requires a complete re-design. Your purpose and intended audience may change over time. New categories of information often necessitate a completely new look for the home page and perhaps the rest of the website. New Web technologies may make certain design approaches feasible for the first time. A complete re-design requires a lot of effort, but it is a highly creative and rewarding task that most Web designers look forward to.

Building the Prototype

Once you are confident in the design of your sketches and sample pages, you can build the prototype. Achieving this milestone often gives design teams a morale boost, for this is when they really see the project coming together. The prototype is also the basis for the most extensive evaluation tasks you will perform. This is because the prototype is complete enough to provide really meaningful feedback and because you are still not too far along in the project to make the changes indicated by the evaluation.

The prototype is built by linking your sample pages and, usually, by creating new pages as well. You want to be really sure that you have a truly representative sampling of the different kinds of pages that will appear in the finished website. Be sure to include any pages you have special doubts about. Prototypes are also often used as technology demos in which you test your JavaScripts, integration of video content, and other technologies that might give you trouble. If the website is small, you may choose to make a clickable prototype of the entire website. You can also prototype pages reflecting two competing design ideas so that you can make an informed choice between the alternatives. Note that prototyping is one task in which the building phase blends with the design phase.

Some design teams regard a collection of paper sketches as a prototype. And, yes, various kinds of useful evaluations can be performed with a paper mock-up. But there are also significant limitations to what you can learn with only a paper prototype. In particular, paper prototypes do not give users the full experience of navigating a complex website.

Evaluations—Especially User Testing

As we've noted, it's very desirable to perform evaluations "early and often." Evaluation tasks begin in the planning phase and continue through the design and building phases. Useful forms of evaluation performed in the design phase include soliciting feedback from knowledgeable peers and experts and from potential users. You can also check your design against well-established guidelines and successful, well-respected websites. Good guidelines include the IBM Ease of Use Guidelines (www-3.ibm.com/ibm/easy/eou_ext.nsf/publish/561) and the Microsoft Web Design Guidelines (<http://msdn.microsoft.com/workshop/management/planning/improvingwebsiteusa.asp>). See also the special issue of *Technical Communication*, "Heuristics for Web Communication" (2000) for guidelines that include numerous citations of the research literature.

No form of evaluation, however, substitutes for user testing. Observing users as they work with your prototype provides you with the most revealing and reliable information about the success of your various design decisions.

User testing and evaluation comprise an entire field. In many well-funded projects, usability specialists are brought in to design and perform user tests and analyze the results. You do not need to be an expert in user testing, however, to perform valuable tests. For more information on user testing, see Joseph Dumas and Janice Redish (1993) and Jeffrey Rubin (1994). Below, we outline some of the major issues and provide an overview of the process.

Choosing and Working with Subjects

Recruit test subjects who are as similar as possible to the eventual users of the website. Don't use team members or anyone else who is close to the project: They are almost always "contaminated" by their understanding of the design and how things are supposed to work. Also avoid people who, for whatever reason, will not be sufficiently candid. Always encourage subjects to be tough on your design.

Be sure to make the test experience comfortable for your subjects. When you first solicit your subjects, you should tell them how long the test will take and you should stick to the time you specify. When you solicit your subjects and again at the beginning of the test, you should make clear that it is the design, rather than the subjects themselves, that is being tested. When subjects are nervous about looking stupid, they provide less useful information.

You must observe ethical standards in your testing. Causing discomfort and distress not only reduces the effectiveness of your test, it is unethical. Another important ethical requirement is not compromising your subjects' privacy in any way—for example, by gossiping about a subject's performance. You do not have to fully inform subjects about what you are trying to learn or about the design of the test, but you cannot perpetrate significant deceptions. In university settings you may need to follow standard procedures for working with human subjects.

User testing is not formal research and doesn't have to meet the rigorous demands of the experimental method. Your goal is to gather enough information to feel confident about the design decisions you need to make. Very often four or five subjects are sufficient for a particular test, although some test designs require

more subjects. It can be difficult to find appropriate subjects, and testing subjects, tabulating their responses, and analyzing the data are time-consuming tasks.

Designing Your Test

The design of your test depends largely on the kinds of information you are looking for. You can simply ask subjects to explore your prototype. In this way you can observe and record what parts attract them and hold their attention and what navigation problems they encounter. Also, you can ask various questions about their reactions to what they've looked at. Often, however, there is more value in structured kinds of tests in which you ask your subjects to perform specific tasks. For example, the designers of a city website might ask test subjects to find the location of Harold Blank Park or determine whether it is necessary to obtain a permit to hold a neighborhood block party.

As the subjects proceed through the tasks, you may wish to record data regarding the frequency and types of errors and the time required to complete tasks. A different and often better approach (which invalidates data about performance time) is to ask your subjects to vocalize their thoughts as they work through the tasks. Their ongoing commentary provides very rich information, particularly about the difficulties they are having.

You can also learn a great deal by asking subjects to make predictions: "What kind of information do you think you will get if you follow this link?" "What do you think will happen if you click the Back button?"

If a subject gets stuck, you usually want to help the person get going again; however, if you've given a subject a lot of help, you need to be very cautious basing design decisions on the performance of that subject. It is often useful to videotape the test sessions, though you will need your subjects' permission.

If you test several subjects in a relatively short period of time, you may want to conduct a "focus group" meeting in which the subjects share their reactions with each other. Often subjects reveal more when they bounce their reactions off each other, and you can often get a meaningful consensus on various questions. "OK, how many people agree with Ivana that the background was too busy for you to read the text easily?" To a large degree the success of a focus group depends on the objectivity and skill of the focus group leader. In large, well-funded projects, professionals are often brought in to moderate focus groups.

Often clients or managers will ask you to write a report or give a presentation summarizing the tests you performed, your findings, your interpretations and explanations of these findings, and the design decisions (if any) you think should be made.

Tracing User Scenarios

Tracing user scenarios is not really user testing at all. But there are important similarities. At times, we can gain valuable design information by putting ourselves in the role of users and clicking through the prototype. In other words, once the prototype makes the design concrete, some unquestionably bad aspects of the design can be readily identified if we simply trace the actions that a user would almost inevitably take in a particular situation. For example, we might discover

pages that require too much scrolling, that load too slowly, that contain too many links, and that contain links that do not clearly indicate their destinations.

Following Up on the Evaluation

The purpose of performing evaluations is to correct any design flaws before investing in the building phase of the project. Unfortunately, this does not always happen. Sometimes, designers or their managers persuade themselves that the design is “basically OK” in the face of strong evidence that it is not. In other instances, schedules simply do not permit re-designs—at least not until after the initial release of the website. If your project has been well planned, however, there should be time to assess the feedback from your evaluation tasks and incorporate necessary changes into the design you take into the building phase.

If you determine that your prototype is severely flawed, the scope of the re-design effort may be large enough that you need to re-visit the broad design decisions you made at the beginning of the design phase or even in the planning phase—this is the dotted arrow in Figure 3.2 extending from the Evaluation box back to planning. For example, your subjects may tell you forcefully that the structure of the hierarchy, from the home page on down, confuses them or that the theme of the website does not appeal to them. Bad news indeed! After you revise your plans (including the schedule), create a new design, and build a new prototype, you should perform another round of evaluation. How else will you know for sure that your new design has addressed the problems you uncovered and that it hasn’t introduced new ones? Contemplating these potential problems should persuade you to follow a good development process with lots of evaluation built in from the beginning.

Design Reports

Here we discuss both task reports and the comprehensive design report.

Task Teams and Task Reports

During the design phase and in the planning and building phases as well, project teams often divide into various small groups to tackle particular parts of the project. We will call these groups “task teams.” For example, two members of the Asthma Horizons design team might be assigned to the task team responsible for the animation showing the function of the lung. They will design this animation, and they may later build the animation. Another task team might focus on the monthly profile feature that is planned for the site. They will create guidelines for creating each month’s profile. Another task team may take responsibility for user testing and other forms of evaluation. Very likely, one individual will take part in more than one team, especially because many teams will complete their tasks in a few weeks and disband.

These task teams are likely to report orally to the entire project team during meetings. Also, they should produce one or more reports that explain how they

are progressing on their task. These reports should be incorporated into the project notebook, which should be available to everyone on the project. So, for instance, the task team working on the text of the "Causes and Symptoms" section will consult the project notebook because they need to know exactly what the lung animation is going to show. The report of the Monthly Profile Task Team is shown in Appendix C, "Reports."

The Comprehensive Design Report

Often, especially in the case of larger projects, a comprehensive design report is compiled toward the end of the design phase. This report updates the planning report and provides a more detailed account of the current state of the project, in particular the design. Like the planning report, the comprehensive design report helps the members of the project team maintain a common image of the website they are working on. Also, it will prove valuable to anyone who needs to understand the project. But the most important audience of this report consists of the managers or clients who must approve the design and the project as a whole before the building phase starts. Very possibly, these individuals will expect the report to be submitted in conjunction with a face-to-face meeting and presentation.

This report is drawn in large part from the project notebook. As you can see in Figure 3.8, this report resembles the planning report and has many of the same sections. Naturally, a key component of the report is the prototype, whether in the form of screen captures or just a URL. Equally important are the findings of the user tests and other evaluation tasks. The report should also include the most current representations of the structure of the website. A selection of older diagrams,

Design Report

- Statement of Purpose
- Audience Analysis
- Website Theme and Style
- Site Design
 - Analysis of key design issues
 - Examples from prototype
 - Content list
 - Node-link diagram
 - Summary of user test results
- Plans for Content Review and QA Testing
- Schedule and Budget
- Appendixes
 - User test data
 - Early design sketches

Figure 3.8. Possible section headings for a design report.

design sketches, and other documents that explain the evolution of the design may also be included, probably in an appendix.

The Building Phase

Building is the third and final phase of the Web development process. The word “building” refers to creating and completing all aspects of the website. Whatever hasn’t been built for the prototype needs to be built now.

The building phase naturally varies enormously with the nature of the project. Building an online resumé requires much less content and a lot less coding than building a large commercial website. However much work is required, the key point regarding the building phase is that you want it to proceed in a steady, predictable manner.

As we noted, design and planning tasks will continue into the building phase. In particular, as you create graphics, write text, and create other content elements and as you lay out the pages that contain these content elements, you will be making a large number of design decisions. These decisions, however, should be extensions or more specific instances of more general design decisions you made and evaluated during the design phase.

Setting Up the Work Environment

Beginning with your prototype, you will start accumulating a large number of files: HTML files, graphics files, etc. You will accumulate far more once you’ve started your “Web page factory” in the building phase. To avoid complete chaos, you will need to work out a logical and efficient scheme for naming and storing your files and for naming and organizing the folders (directories) in which the files are contained.

Some teams maintain separate folders for various content types (a folder for HTML files, a folder for graphics files, etc.). Others create a folder for each part (or branch) of the website (a folder for Medications and Treatments, a folder for Northwest Focus, etc.). Still others use a combination of strategies—separate folders for graphics, audio, and video files and a folder for HTML files with subfolders for each branch of the website. It can be very disruptive to make changes in filenames or the organization of the folders. In fact, changing folder names may result in broken links between Web pages. So plan carefully before you start naming and saving files.

Unless you are working alone, you will need to establish policies for who is authorized to change various parts of the project and under what circumstances. The larger the team, the more important it is to devise and communicate these policies.

Most important, you need to back up your work frequently and store at least one of your back-ups off-site. Files become corrupted; hard drives crash; machines are vandalized or stolen; and other mishaps occur that will make you very thankful if you’ve backed up your files recently.

Developing, Revising, and Reviewing Content

Developing quality content is hard work. Even though you are carrying through design ideas that have been previously worked out, both text and graphic elements must be designed, created, carefully reviewed, and very likely revised at least once. Furthermore, even if you've created and updated a node-link diagram and other representations of website structure, more linking will probably be necessary. Only as paragraphs of text are actually written and added to pages will certain opportunities for useful links, especially secondary links, become apparent to the writer and to editors and reviewers.

One challenge in the content development process is achieving consistency among content elements. If there is more than one writer, the writing must be coordinated to prevent unwanted differences in level of technicality, level of detail, style, and so forth. Consistency must also be maintained for other content types. For example, if two people are creating graphs and illustrations, they must adopt the same overall approach. Consistency can be difficult to achieve even on a solo project.

To help achieve a high level of consistency, you should keep a record (often called a "project style sheet") of the team's decisions regarding consistency. So, for example, the Asthma Horizons style sheet might specify "non-smoker" rather than "nonsmoker" and asthma "episode" rather than "attack." Many organizations compile and distribute an organizational style guide, which records how the organization wishes to handle various issues. Finally, it is very wise to draw upon a comprehensive, widely used style manual such as the *Chicago Manual of Style*, *The Style Manual of the American Psychological Association*, or the *MLA Style Manual and Guide to Scholarly Publishing*.

Once the content is prepared, it should be subjected to a careful review. Table 3.1 describes the standard reviews for text and graphics.

Dynamic content (animation, video, and audio) goes through a similar process, but there are additional considerations. How clear is the sound? How smooth is the animation? How sharp is the video, and is it sufficiently free from visual flaws? Lapses in quality do not necessarily require obtaining new content; there are sophisticated editing tools that can improve the quality of audio and video sequences.

Coding Special Features

Often there are scripts, applets, and online computing functions built into a website. To help keep your project on schedule, you will usually want to make progress on these aspects of the website even before all the content is complete. For example, someone can begin to work out the details of implementing a calendar page before anyone knows the first month's calendar items. Similarly, you can code a text-entry form that collects user-supplied information and generates an automatic email response before all the content is in place. Regardless of the timing of the work, you will want to establish check points to ensure that the technical side of the project is on track.

Table 3.1 Standard Reviews for Text and Graphics

Review	Purpose	Reviewers
Editorial review for text elements	<ul style="list-style-type: none"> • Is the topic covered adequately? Are the information needs of the audience being met? • Is the theme of the website expressed? • Is the writing clear, fluent, and well organized? • Is the text properly divided by headings and subheadings? • Is the writing correct in regard to spelling, punctuation, usage, and grammar? • Do links clearly indicate their destinations? 	Writers other than the author; editors
Editorial review for graphics	<ul style="list-style-type: none"> • Does the graphic accurately and meaningfully represent something in the physical world, convey a concept, or express quantitative relationships? • Is the level of detail appropriate for the intended purpose? (Watch especially for unnecessary detail and clutter.) • Does the styling of the graphic express the website's theme? • Is the styling of the graphic consistent with other graphics and visual content? • Is the graphic well positioned with adequate spacing? 	Other graphic artists; editors
Accuracy review for text and graphics	<ul style="list-style-type: none"> • Is the content—both scientific and technical content and general content—accurate and fair-minded? 	Subject matter experts (SMEs); editors
Policy and legal reviews for text and graphics	<ul style="list-style-type: none"> • Does the content represent the organization appropriately, adhere to legal requirements, and uphold ethical standards? 	Managers, attorneys, etc.

Quality Assurance Testing

Websites are susceptible to a wide range of bugs and malfunctions. These include broken links, links that go to the wrong place, video and audio sequences that don't play properly, and scripts that do not run (sometimes generating error messages and sometimes just not producing the expected behavior). Also, there is the very considerable problem, discussed earlier, of browser compatibility: A project may run perfectly on one browser but not display properly on another or on a different version of the original browser.

You need to conduct a comprehensive set of quality assurance (QA) tests. Many tests need to be repeated more than once and some do not. A button may work one week but fail the next because the page to which the button linked was cut from the project. You are especially apt to find bugs and malfunctions

if your website is moved from a development server to the server on which it will be launched. The specific tests you will need to conduct depend, of course, on your particular project. Table 3.2 lists some tests that are necessary for most projects.

Similarly, CD/DVD titles may work differently or not work at all on different computers. If you are developing a CD/DVD title, you will want to make a limited number of preliminary copies and test them extensively.

The Completion Report

Very often a completion report or perhaps just a cover letter or memo is prepared at the end of the project. This report is the formal presentation of the project to managers or clients. It will explain changes in design and parts of the project that may have been scaled back or left undone. It will specify or suggest future development plans.

Post-Release Evaluation

Once the website is released, you can get certain types of feedback that were previously impossible. Websites (and CD/DVD titles) are frequently reviewed in both newspapers and specialized periodicals. Web servers can collect (in server "logs") valuable information about site visitors, including the number of visitors, when they visit, the pages they visit, and how long they stay (Rosenstein 2000). In the case of e-commerce websites, there are revenue figures. You can also ask visitors to

Table 3.2 List of Tests

Links	Check that all links function correctly. There are programs that automate much of the link testing.
Code	Check that all scripts and code function properly. Create tests that check for basic functionality. (Does the system display a confirmation message when a user submits a form?) Test also for atypical situations. (What does the system do if a user types a name that will not fit in a text box?)
Platforms, browsers, and screen resolution	Check that the pages display properly and function correctly on all the platforms (PC, MAC, Unix) and versions of browsers you have targeted. Check that the design works with different screen resolutions (no horizontal scrolling).
Speed	Check that the pages and elements on pages load quickly at the Internet connection speeds you have designed for.
Accessibility	Check to ensure that your project meets the accessibility requirements you established. You can use the software tool, Bobby (www.w3.org/wai/), to check accessibility.

fill out feedback forms. The information you gather through post-release evaluation will be extremely valuable as you plan for the next update, refresh, or re-design of your website.

People and Their Roles

Now that we have seen the complete development process, we can look more closely at the people who do the work and the roles they perform. Because projects and the size of project teams differ greatly, we will describe a large number of relatively specific roles. Very often, however, one person performs several roles—"wears multiple hats." The smaller the team, the more hats team members are likely to wear. The roles we cover are summarized in Table 3.3.

Producer

The head person on a project is often called the producer. Producers have experience and expertise in staffing, scheduling, and budgeting. They know how to manage the members of the project team and how to solve personnel problems. They know how to work with people outside the project team, in particular, clients or other people who authorize and approve the work. Often, producers write progress reports and give presentations to these people. All the skills mentioned thus far can be summed up in the phrase "project management."

In addition to project management skills, producers need a broad background in Web development, both design and implementation. The producer doesn't need to be an expert HTML coder, a talented artist, a polished writer, or have any other specific area of expertise. But the producer does need to create a

Table 3.3 Roles in a Web Development Project

Producer
Marketer
Information designer (or information architect)
Core content creators: Writers, artists, photographers, animators, videographers, and audio specialists
Graphic designer
Editor
Interface designer
Information retrieval specialist
Usability specialist
Instructional designer
Quality assurance specialist
HTML coder, programmer, documentation specialist, and tech support technician

vision of the final website, make sure this vision is attainable, communicate the vision to others, devise a set of appropriate and coherent project objectives, and make sure they are met. Usually, the people who become producers have extensive experience in the field of Web design and other media. Very often, they are experts in several areas of Web development.

Marketer

In the case of corporate websites intended for promotion or commerce, there is likely to be at least one marketing specialist involved. The marketing specialist contributes to the design—often from the beginning of the project. Marketers research the audience, usually with a special interest in their behavior as consumers. Marketers also help strategize the business model. For example, if the marketer's company operates a website featuring research reports for investors, the marketer will determine whether it is best to sell yearly subscriptions or let people purchase individual reports.

Marketers use various techniques to increase the number of visitors to a website. For example, they will arrange deals, such as reciprocal linking with another (non-competing) website and set up other kinds of partnerships. They are also the people who make sure that the site's URL is included in the organization's non-Internet advertising. In the case of CD/DVD titles, marketers figure out how to advertise, distribute, and sell the product, much like book publishers market and sell books.

Information Designer (or Information Architect)

The information designer, also referred to as an "information architect," takes broad responsibility for the design of the website. The information designer will work closely with the producer and marketer on strategy and goals, which includes defining the theme. Also, the information designer takes primary responsibility for the design of the navigational interface.

Information designers come from numerous fields, notably user interface design, graphic design, and professional and technical communication. The job, however, requires a complete understanding of Web design and development, including Web technologies. The job also requires creative vision and the ability to work well in teams. Information designers must also be willing to quickly become familiar with the subject area (e.g., asthma) of the websites they work on.

Core Content Creators

Writers, artists, photographers, animators, videographers, and audio specialists create the core content elements. Core content creators must, of course, be highly skilled in the medium in which they specialize, but they must also have a broad understanding of Web design. Core content creators must fully understand the goals of the project for their content to fit the overall design. For example, both the writer and the videographer must express the same theme, even though they are

working in different media. The writer's choice of words and syntax and the videographer's decisions regarding camera angle, lighting, and lens focus will both reflect their understanding of the theme.

Graphic Designer

Graphic design encompasses a broad range of decisions about the visual appearance of a website. Designing page layouts, devising color schemes, and choosing fonts are all tasks associated with graphic design. The graphic designer makes sure that all the pieces of the visual design fit together. If a graphic or photograph needs to be modified in some way, graphic designers will do this. Often graphics designers choose pre-existing photographs and drawings from an organization's library of corporate art or from a stock media collection. Finally, graphic designers often serve as graphic artists and create graphics and simple (GIF) animations.

Although there are many self-trained graphic designers, the ideal background includes a bachelor's or master's degree in graphic design. Graphic designers now work primarily on the computer, and so must be highly proficient with an illustration software application such as Corel Draw or Adobe Illustrator and an image editing package such as Adobe Photoshop or JASC's Paint Shop Pro.

Editor

Editors improve the quality of text. They look for specific problems in grammar, punctuation, spelling, usage, and consistency, but they also consider the overall effectiveness of text elements. Also, just as in the world of print, editors do not restrict themselves to text. Editors will flag a graphic that is too small, too dark, or doesn't capture the subject appropriately. They will note problems in a video or audio sequence. Often editors check for broken links and other coding errors.

Interface Designer

Interface designers specialize in designing systems of all kinds so that they are easy to understand and use. Interface design is often taught at universities in departments of psychology, computer science, industrial engineering, and technical communication.

Interface designers are well prepared to design the navigational interface and may serve as a project's information designer. Interface designers are especially important in websites such as online stores and banks in which there are important online computing functions.

Information Retrieval Specialist

Information scientists study how people search for information. Consequently, they are the real experts in choosing and implementing the website's Search feature and ensuring that the site's content is as searchable as possible.

Because it is usually crucial for a website to draw as many visitors as possible, information retrieval specialists take steps to get their websites noticed by the various Web-wide search engines.

Usability Specialist

Usability specialists determine how successful users will be in working with a website. Usability specialists design and perform studies, then analyze, interpret, and present their findings. Usability specialists have a background in such fields as user interface design, psychology, and technical communication.

Instructional Designer

An instructional designer focuses on designing the content so that it is easy to learn and remember. Not surprisingly, instructional designers are usually brought into projects for which education and learning are primary objectives. This includes projects intended for corporate training, those that combine entertainment and education, and projects specifically intended for use in schools. Instructional designers should have backgrounds in instructional design, cognitive psychology, or a similar field. Because many information designers have instructional design backgrounds, they can often assume this role.

Quality Assurance Specialist

Quality assurance specialists make sure the website has been correctly implemented. They devise systematic and comprehensive tests that will uncover coding errors and similar problems. QA specialists often automate tests using special tools that have the same effect as someone manually clicking a button or entering data in a form. QA specialists usually have a background in computer programming or software engineering.

HTML Coder, Programmer, Documentation Specialist, and Tech Support Technician

While writers and other team members can usually code HTML or work with authoring tools that create HTML code, there are coding specialists and programmers who usually handle the more complex aspects of implementing a website. This is especially true in the case of database-driven websites.

Some websites, especially those with extensive online computing functions, will require a significant amount of on-screen help. This documentation should be created by a documentation specialist, and so there should either be a documentation specialist on the development team or one should be called in to assist with this aspect of the project.

With either a website or a CD/DVD title, it is possible that users will encounter technical problems. This may require a tech support person to answer telephone, email, and message board queries and to participate in real-time dialogues with users. Often tech support is handled by a website's webmaster.

Profile: Points West Kayak Tours

Let's sit in on another work session with Annie and Peter as they tackle the design of their website.

Advancing the Content List and Working Out the Structure

Annie has her laptop out and, looking closely at the content list, she begins to work out a tentative hierarchy using her word processor's outline feature. The first-draft outline is shown in Figure 3.9. The first, second, and third levels of the outline (formatted in boldface) all represent pages. Annie also adds various notes under the headings using body text.¹

Peter and Annie then examine the outline closely and make many changes. In particular, as you can see in Figure 3.10, they simplify the first-draft outline, consolidating several branches. For example, they realize that the branch Kamechak Bay and Surrounding Areas overlaps the branch Scenery, Wildlife, and Local History, and so they remove the Kamechak Bay page from the outline. Also, they decide that they do not need the four third-level pages Experience, Fitness, Age, and Safety. The content of these pages will fit easily on the single parent page Experience, Fitness, Age, and Safety—which, in response to a friend's comment, is given a shorter and more positive name, No Experience Necessary! When they have finished with the outline, they have planned out a website consisting of 10 pages.

Peter draws a node-link diagram, shown in Figure 3.11, that corresponds to the revised outline. Note that the node-link diagram shows what the outline did not: links between branches of the hierarchy.

Drawing Design Sketches and Creating Pages

Soon Peter begins sketching the home page for their website (see Figure 3.12). The sketch is not final; Peter will improve upon the design considerably before it goes public.

The photos on the home page echo the theme of the website. One shows a group of kayakers paddling near a rocky island with glacier-covered mountains visible in the background against a brilliant blue sky. The other photograph shows a group of kayakers eating lunch on a sandy beach. Not only is the subject matter appropriate, but the rich greens and blues are vibrant and cheerful and suggest the enjoyment of nature. Annie and Peter rejected some moody, fog-en-shrouded photos, even though they personally like them.

Annie and Peter then create design sketches for the remaining 9 Web pages. Because this is a small, straightforward website and because much of the content has been “tested” in the form of their brochure, these design sketches will serve as a paper prototype for evaluation purposes.

Evaluation

As a first step in evaluating their website, Annie and Peter review their design sketches against a set of design guidelines they find in a book. What they read prompts a discussion.

¹Here is a useful trick that Annie and Peter have figured out. It seems logical to format the outline entry for the home page as a Heading 1 and to format the outline entries for second-level pages as Heading 2 (and so on). However, especially if your outline will extend to three or more levels, it's best not to “waste” a level with the home page entry. Use Heading 1 for your second-level entries as well as for the home page entry and simply increase the font size of the home page entry so that it is distinguishable from the second-level entries. Then, use Heading 2 for your third-level entries, and so forth.

- ✦ **Points West Kayak Tours**
 - Include welcome paragraph with quick information for busy folks.
- ✦ **Where we go**
 - Describe full- and half-day trips.
 - ✦ **Special trips**
 - Mention charters, group rentals.
- **Kamechak Bay and surrounding areas**
- ✦ **Schedule, pricing, reservations**
 - Include cancellation policy. Mention that we run trips in light rain.
- ✦ **What to bring**
 - Include lunches and snacks as items we provide.
- ✦ **Experience, fitness, age, and safety**
 - General stuff about experience, fitness, age, and safety.
 - ✦ **Experience**
 - No experience necessary at all.
 - ✦ **Fitness**
 - Expect a reasonable level of health and fitness—especially for full-day trips. But pacing is slow, with breaks.
 - ✦ **Age**
 - Trips suitable for seniors. Trips, especially full-day trips, are not suitable for children.
 - ✦ **Safety**
 - Usual stuff
- ✦ **Homer area weather**
 - Mention that summer weather is generally clear and sunny.
 - Add external link for local weather websites.
- **Lunches and snacks**
- ✦ **Finding us**
 - Map of Homer. Map of Homer Spit.
- ✦ **Who we are. What we do**
 - Brief bio sketches of Annie, Peter, and Kim.
- ✦ **Scenery, wildlife, and local history**
 - Describe scenery, wildlife, and local history.
 - **Homer area bird list**
- ✦ **What to do in Homer**
 - External links (maybe just to Chamber of Commerce page).

Figure 3.9. Annie and Peter's first-draft outline.

- ✦ **Points West Kayak Tours**
 - Include welcome paragraph with quick information for busy folks.
- ✦ **Where we go**
 - Describe full- and half-day trips.
 - ✦ **Special trips**
 - Mention charters, group rentals.
- ✦ **What to bring**
 - Mention that we provide lunches and snacks.
- ✦ **No experience necessary!**
 - Cover fitness and safety here.
- ✦ **Making reservations**
 - Include cancellation policy. Mention that we run trips in light rain.
 - Provide external links to Chamber of Commerce, Bed and Breakfast Association, restaurant listings, weather information, etc.
- ✦ **Finding us**
 - Map of Homer. Map of Homer Spit.
- ✦ **Local scenery, wildlife, and a bit of history**
 - Describe scenery, wildlife, and local history.
 - **Homer area bird list**
- ✦ **Who we are**
 - Brief bio sketches of Annie, Peter, and Kim.

Figure 3.10. Annie and Peter's revised outline.

Peter: Listen to this:

Make sure none of your pages scroll. Some people don't know how to scroll, some people know how but won't notice that the page scrolls; and some people will refuse to scroll. One way or another, no one will ever see what's below the scroll line.

Annie: I don't buy it, Peter. I scroll. Not always, but when I'm interested.

Peter: Yes, I'm not sure we should follow every piece of advice we come across.

Next Annie reviews the design sketches trying to imagine how their clients might respond to the content and overall design. Peter makes a

few changes and then asks for feedback on the revised design sketches from some friends, including a professional graphic designer. Peter asks his evaluators to be candid about anything they don't like.

Building

Because Annie and Peter only used design sketches rather than sample pages as their prototype, they need to do a lot of writing and layout work as they build. They work carefully, reviewing and editing each other's work. Once the pages are built, they test their links and experiment with viewing the site at different screen resolutions. Finally, Annie moves the files to the server of their ISP (Internet Service

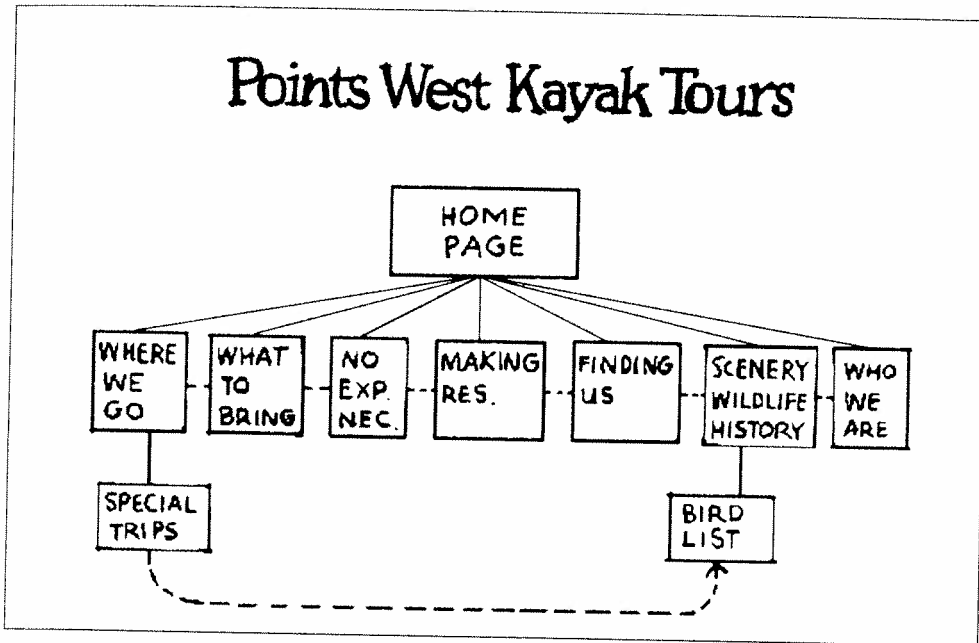


Figure 3.11. Peter's node-link diagram that corresponds to the revised outline.

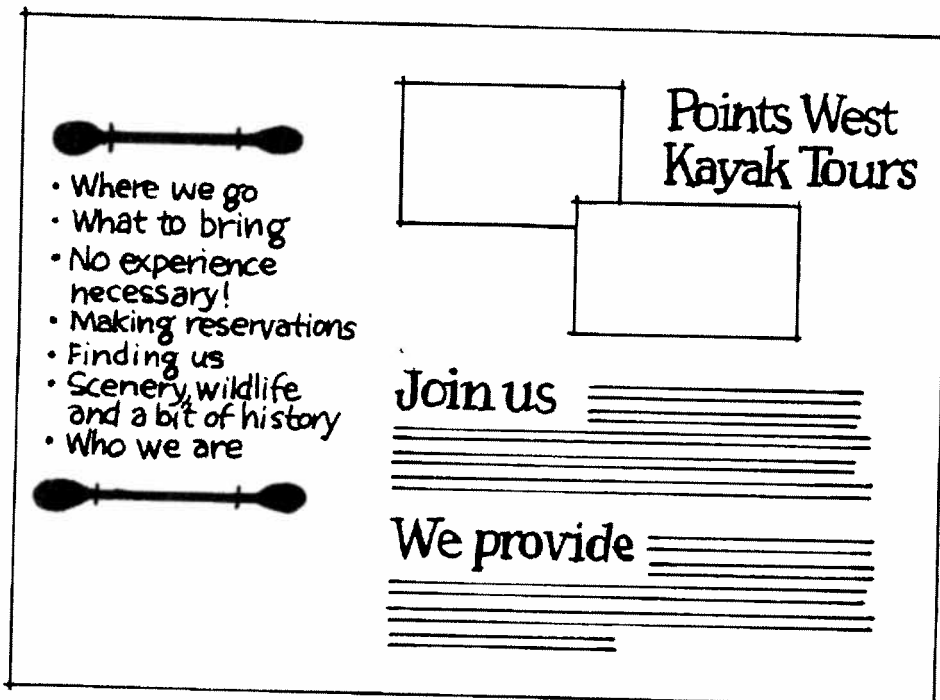


Figure 3.12. A design sketch of the Points West home page.

Provider), and they've "gone live." They add the URL to their magazine advertising and business cards. The next time they reprint their brochure, it will feature the URL.

A website is never really finished, and Annie and Peter continue soliciting feedback and

thinking about enhancing the site. When they get their first emails asking for trip information, Annie's response includes a few questions asking these people about their use of the Points West website.

Summary

Chapter 2 covered the first phase of Web development: planning. This chapter focuses on the design and building phases and completes our discussion of the development process.

1. The progression from planning to design to building is not a simple straight line. There is significant blending among the phases.
2. In the design phase you draw upon the work you did in the planning phase. You must now gain a much fuller understanding of (1) the eventual content of the website, (2) how the pages fit together into a well-organized structure, and (3) what the eventual pages will look like.
3. You need to review, expand, and refine your content list, transforming it into a list of Web pages. You need to think about your users and their information needs in order to create an understandable, easy-to-navigate structure.
4. Even in small projects it is very desirable to represent the structure using at least one of the following: a node-link diagram, a set of note cards, and an outline. Each has its own advantages and drawbacks.
5. Node-link diagrams can be sketched or created by a software application. Although flexible and intuitive, they take effort to prepare and update. If the website is really large, it may be difficult or impossible to do more than represent a portion of the website.
6. Note cards take the form of 3 x 5 index cards or something similar. Cards, representing Web pages, are laid out on a table or taped or pinned to a wall. Lines representing links can be drawn among the cards. Cards can be easily added, removed, or changed, and you can ask potential users to help you sort the cards into a meaningful hierarchy. It is difficult to represent a large website with cards and to retain a permanent record of the design work.
7. The entries of a word processor's outline feature can represent Web pages. Outlines accommodate large hierarchies and let you add, delete, change, and move entries quickly. Outliners, however, can only represent the basic hierarchical structure. Other kinds of links cannot be shown.
8. Designing the structure of a website requires both top-down and bottom-up thinking. Node-link diagrams tend to favor top-down design, note cards tend to favor bottom-up design, and outliners favor top-down or bottom-up design depending on how they are used.

9. Once you have worked out the structure of your website, you can begin to create design sketches and sample pages. In many ways this is the climax of the creative process. Certain implementation choices should be made at this point such as deciding on the screen resolutions you will design for.
10. Grid systems are sets of horizontal and vertical lines that enable designers to maintain consistency by specifying the permissible variations in page layout. A template is a computer file that incorporates grid lines and various other recurring design elements and so serves as a starting point for designing and building Web pages.
11. As you design, think ahead to the long-term future of the website. When fundamental changes are likely, avoid design ideas that cannot readily accommodate such changes. When there will be regular updating of content, carefully plan how this will be done. Don't, however, commit the site owners to more updating than they are prepared for. Often it is important to retain older content in an archive.
12. Websites that are continually updated usually employ special content-management software and a semi-automatic database-driven development process. Each day's content is "poured" into a stable template following sophisticated rules for the placement of text and graphics.
13. Once you are confident in the design of your sketches and sample pages, you can build a prototype. This is a test version of the website, and it is the basis for the most extensive evaluation tasks you will perform.
14. Perform evaluations early and often. The many useful forms of evaluation include soliciting opinions from knowledgeable peers and experts and from potential users. You can also check your design against well-established guidelines and successful, well-respected websites. User testing provides the most revealing and reliable information.
15. Recruit user test subjects who are as similar as possible to the eventual users of the website. Make your subjects comfortable and make clear that it is the design that is being tested. Observe ethical standards in your testing. Keep in mind that user testing is not formal research; the goal is simply to gather enough information to make design decisions with confidence.
16. Often individual task teams prepare brief reports on a particular part of the project to which they have been assigned. In the case of larger projects, a comprehensive design report is often compiled toward the end of the design phase. Very often a completion report is prepared at the end of the project. Oral presentations may also be necessary.
17. Building is the third and final phase of the Web development process. Although the building phase varies enormously with the nature of the project, the key idea regarding the building phase is that you want it to proceed in a steady, predictable manner.
18. In the building phase content (often large amounts of content) must be designed, prepared, carefully reviewed, and very likely revised at least once for quality and consistency. Get an early start coding scripts, applets, and online computing functions. Bugs, malfunctions, and compatibility problems can only be caught by systematic and repeated quality assurance testing.

19. In a Web development effort, team members play many roles: (1) producer, (2) marketer, (3) information designer (information architect), (4) core content creators, (5) graphic designer, (6) editor, (7) interface designer, (8) information retrieval specialist, (9) usability specialist, (10) instructional designer, (11) quality assurance specialist, and (12) HTML coder, programmer, documentation specialist, and tech support technician. Websites can be created with a small, versatile team or may involve a large group of people each of whom undertakes just one or two roles.

References

- Arbortext. www.arbortext.com
- Dumas, Joseph S., and Janice Redish. 1993. *A Practical Guide to Usability Testing*. Norwood, NJ: Ablex Publishing.
- Hablador. www.hablador.com
- IBM Ease of Use Guidelines. www-3.ibm.com/ibm/easy/eou_ext.nsf/publish/561
- Metatorial Services, Inc. www.metatorial.com
- Microsoft Web Design Guidelines: Improving Web Site Usability and Appeal, Guidelines compiled by MSN Usability Research (Kevin Keeker). 1997. <http://msdn.microsoft.com/workshop/management/planning/improving-site-usa.asp>
- Rosenstein, Mark. 2000. What is actually taking place on Web sites: E-commerce lessons from Web server logs. *Proceedings of the 2nd ACM Conference on Electronic Commerce* 38–43. www.apparent-wind.com/mbr/papers/ec2000.pdf
- Rubin, Jeffrey. 1994. *Handbook of Usability Testing: How to Plan, Design, and Conduct Effective Tests*. New York: Wiley.
- Technical Communication Special Issue. 2000. Heuristics for Web communication. *Technical Communication* 47.3: 301–410.

Discussion and Application

Items for Discussion

1. The model of the development process shown in this chapter borrows from two traditions: software engineering and print publishing. Putting aside the obvious differences between paper and the Web, compare the development process for a website with the development process for a print publication. What similarities do you see between the two? What are the differences? What similarities and differences can you find between Web development and the development of software applications?
2. A well-known adage in the world of engineering is that your biggest mistakes are made on the first day. Discuss this adage in the context of Web design.

3. When the first units of the Saturn automobile rolled off the assembly line, the inside of the glove compartment door had round recessed areas intended to serve as cup holders. The door, however, was hinged so that it would not lie flat enough to support a cup. How might such an engineering design glitch occur? What would be an analogous problem in a Web development project?
4. Imagine that you are working for a company that publishes a monthly employee newsletter. Your manager has decided to publish the newsletter both in the traditional print format and on the company's intranet. What are the main design issues that you will need to deal with in preparing the online version? Should the online version look like the print version or have its own look?
5. Identify a website that exhibits good page design and, in particular, an appropriate degree of consistency among the pages. Try to reconstruct the grid system that was used by the designers. How much and what kinds of variation did the designers allow themselves? Which aspects of the page design were especially successful? Are there flaws?
6. The figure below shows the first design sketch for the home page of Community Composting, a non-profit organization that promotes composting as a sound environmental practice. The theme for the website is this: "Composting is easy to do, it benefits the environment, and you will have a supply of rich soil for your garden and lawn." Do you think the design team is making a good start on the design of the home page? What do you like or dislike?

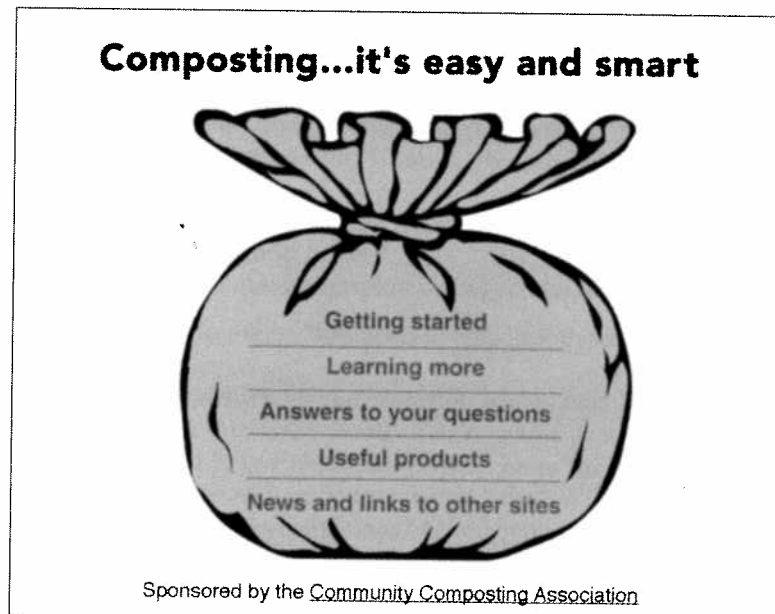


Figure 3.13. An early design sketch for the Community Composting home page.

7. Examine two sets of Web design guidelines such as those cited in this chapter. How do they differ? Which do you find most useful?
8. Interview a Web designer to learn what strategies he or she uses in planning, designing, and evaluating projects. Try to find out how planning and design differ from one project to the next and what factors cause these differences.

Application to Your Project

1. The three ways of representing the structure of a website are a node-link diagram, a set of note cards, and an outline created with the outline feature of a word processing program. Which of these representations will you employ in designing your website?
2. If you are working on a team project, how will you assign the project roles to the team members?
3. What kinds of evolution (if any) do you foresee for your website? Are you designing your website to accommodate the changes you envision?
4. If you are building your website on a server that will not permanently host your site, have you considered the change-over? What issues and problems do you foresee, and what steps can you take to minimize the potential problems?
5. Make a plan for user testing your prototype. Decide whether it is feasible to conduct a focus group in conjunction with the testing.
6. Create a quality assurance test plan for your project. Identify any tools you will use in the testing process.