CHAPTER 10

Web Site Development

Chapter Objectives

In this chapter, you will learn how to ...

- Describe the skills, functions, and job roles needed for a successful Web project development
- Utilize the stages in the standard System Development Life Cycle
- Identify other common system development methodologies
- Apply the System Development Life Cycle to Web development projects
- Identify opportunities and determine goals during the Conceptualization phase
- Determine information topics and site requirements during the Analysis phase
- Create the site map, page layout, prototype, and documentation as part of the Design phase
- Complete the Web pages and associated files during the Production phase
- Verify the functionality of the Web site and use a test plan during the Testing phase
- Obtain client approval and launch a Web site
- Modify and enhance the Web site during the Maintenance phase
- Compare the goals of the Web site to the results as part of the Evaluation phase
- Find the right Web host provider for your Web site

This chapter discusses the skills needed for successful large-scale project development and introduces you to common Web development methods. It is important to realize that each project is unique; each has its own needs and requirements. Choosing the right people to work on a Web project team can make it or break it.

Graphic Designer

The **graphic designer** determines appropriate use of color and graphics on the site, creates page layouts, and designs graphics. The graphic designer may work closely with the Web developers to create graphic buttons used in mouseover effects.

Database Administrator

A **database administrator** is needed if the site accesses information stored in databases. Database administrators create databases, create procedures to maintain databases (including backup and recovery), and control access to databases.

Network Administrator

The **network administrator** configures and maintains the **Web server**, installs and maintains system hardware and software, and controls access security.

Web Developer

The **Web developer** writes XHTML code and client-side scripting such as JavaScript. The Web developer may develop server-side processing such as PHP or ASP. Typically, there are multiple Web developers assigned to a large project, each with his or her area of expertise.

Project Staffing Criteria

Whether the project is large or small, finding the right people to work on it is crucial. When selecting staff for a project, consider each individual's work experience, portfolio, formal education, and industry certifications.

Another option to staffing a Web project (or developing an entire Web site) is to outsource the project—that is, hire another company to do the work for you. Sometimes portions of a project are outsourced, such as graphics creation, multimedia animation, or server-side scripting. When this option is chosen, communication between the project manager and the external organization is crucial. The outsource team needs to be aware of the project goals and deadlines.

Large or small, developed in-house or outsourced, the success of a Web site project depends on planning and communication. Formal project development methodology is used to coordinate and facilitate the planning and communication needed for a successful Web project.

10.2 The Development Process

Large corporate and commercial Web sites don't just happen. They are carefully built, usually by following a project development methodology. A methodology is a step-by-step plan that encompasses the life cycle of a project from start to finish. It comprises of a series of **phases**, each having specific activities and deliverables. Most modern

FAQ

What about other Web site development methodologies?

The development methodology presented in this chapter is a version of the traditional SDLC modified for Web site development. Other development methods include the following:

- **Prototyping.** A small working model is created and shown to the client. It is continually revised by the developer until it is usable for the intended purpose. This method can easily be included in the Web Development Life Cycle during the Design phase.
- **Spiral System Development.** This is excellent for very large-scale or phased projects where it is important to reduce risk. Small portions of the project are completed one after the other in a spiral system of development.
- **Joint Application Development (JAD).** This type of development focuses on group meetings and collaboration between the users and developers of a Web site or system. It is generally used only with in-house development.
- **Agile Software Development.** This development methodology is viewed as innovative in that it stresses responsiveness based on generating and sharing knowledge within a development team and with the client. The philosophy emphasizes code over documentation and results in the project being developed in many small, iterative steps.
- **Organization-Specific Development Methodologies.** Large companies and Web development firms often create their own version or interpretation of site development methodology to be used on projects.

An important aspect of Web site development is that you are never finished—your site needs to be kept fresh and up-to-date, there will be errors or omissions that need to be corrected, and new components and pages will be needed. The first step is to decide why the Web site is needed in the first place.

Conceptualization

What opportunity or issue is the site addressing? What is the motivation for the site? Perhaps your client owns a retail store and wishes to sell products over the Internet. Perhaps your client's competitor just completed a Web site and your client needs to create one just to keep up. Perhaps you have a great idea that will be the next eBay!

Because the focus of your work is to make the site usable and appealing to your target audience, you must determine the site's intended audience. It is crucial to be aware of who your audience is and what their preferences are.

Another task during **conceptualization** is to determine the site's long-term and short-term goals or mission. Perhaps a short-term goal is simply to publish a home page. Perhaps a long-term goal is for 20 percent of a company's product sales to be made on the Web site. Or you may simply want a certain number of Web site visitors each month. Whatever they are, it is better if the objectives are measurable. Decide how you will measure the success (or failure) of your Web site.

Determining the purpose and goals of a site is usually done with the cooperation of the client, project manager, and information architect. In a formal project environment, a document that details the results of this step is created, and then approved by the client before development can proceed.

other analyst, graphic designer(s), senior Web developer(s), and the client's marketing representative and related personnel. Common tasks of the Design phase follow:

- **Choose a Site Organization.** As discussed in Chapter 5, common Web site organizational forms are hierarchical, linear, and random. Determine which is best for the project site and create a site map (sometimes called a flowchart or storyboard).
- **Prototype the Design.** Often, a graphics application is used to create sample Web page mock-ups, or wireframes, as page layouts are created. These can be shown to clients as a prototype, or working model, of the system for approval. They can also be shown to focus groups for **usability testing**.
- **Create a Page Layout Design.** The overall layout, or look and feel, of the site should be designed. The page layout design is used as a guideline for the Home page and Content page layouts. Items such as the site color scheme, size of logo graphics, button graphics, and text should be determined. Using the page layout design and site map, create sample layouts for the Home page and Content pages. Use a graphic application to create mock-ups of these pages to get a good idea of how the site will function. If you use a Web authoring tool, you run the risk of your manager or client thinking you already have the site half done and insisting on early delivery.
- **Document Each Page.** While this may seem unnecessary, lack of content is a frequent cause of Web site project delays. Prepare a content sheet for each page, such as the one shown in Figure 10.3, which describes the functionality of the document, text and graphic content requirements, source of content, and approver of content.

The site map and page design prototypes are usually approved by the client before the team can continue with the Production phase.

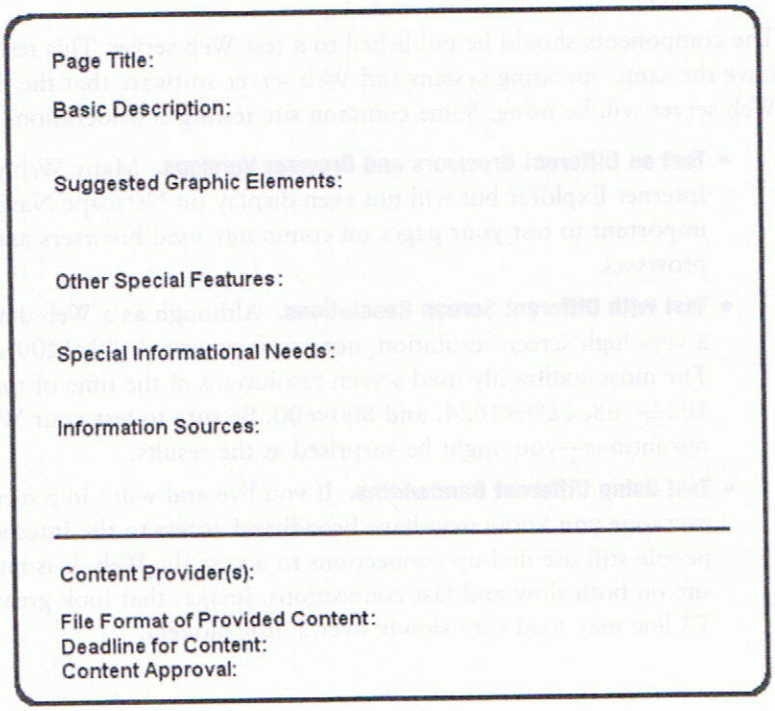


Figure 10.3
Sample content sheet

- **Test from Another Location.** Be sure to test your Web site using a computer other than the one the Web site was developed on, in order to simulate the Web page visitor experience more closely.
- **Test, Test, Test.** There is no such thing as too much testing. Humans make mistakes. It is much better for you and your team to find the errors than for your client to point them out to you when they review the Web site.

Does this sound like a lot to keep track of? It is. That's why it's a good idea to create a **test plan**—a document that describes what will be tested on each page of a Web site. A sample test plan for a Web page, shown in Figure 10.4, can help you organize your testing as you check your document in different browsers and screen resolutions. The document validation section covers content, links, and any forms or scripting that are required for the page. The search engine optimization meta tags are discussed in Chapter 13. However, at this point you should be able to verify that the page title is descriptive and includes the company or organization name. Testing your page using different bandwidths is important because Web pages that take too long to download are often abandoned.

Figure 10.4
Sample test plan

Web Page Document Test Plan

File Name:		Date:	
Title:		Tester:	

Browser Compatibility

	1024x768	800x600	1280x1024	Other	PC	Mac	Linux	Images Off	Print	Other	Notes
Internet Explorer (Version #)											
Firefox (Version #)											
Safari (Version #)											
Opera (Version #)											
Netscape (Version #)											
Screen Reader											
Mobile											
Other											

Document Validation

	Pass	Fail	Notes
XHTML Validation			
Check Spelling			
Required Content			
Required Graphics			
Check Alt Attributes			
Test Links			
Accessibility Testing			
Form Processing			
Scripting/Dynamic Effects			
Usability Testing			

Search Engine Optimization

	Pass	Fail	Notes
Page Title			
Meta Tag (description)			
Meta Tag (keyword)			
Other			

Bandwidth Check

	Time	Notes
28.8 K		
56.6 K		
Broadband		
Other		

Notes

When usability is done during a later phase, such as the Testing phase, the actual Web site is tested. This can lead to a confirmation that the site is easy to use and well designed, to last minute changes in the Web site, or to a plan for Web site enhancements in the near future.

Launch

Your client—whether another company or another department in your organization—needs to review and approve the test Web site before the files are published to the live site. Sometimes this approval takes place at a face-to-face meeting. Other times, the test URL is given to the client and the client e-mails approval or requested changes.

Once the test Web site has been approved, it is published to your live production Web site (this is called a **launch**). If you think you are finished—think again! It is crucial to test all site components after publishing to make sure the site functions properly in its new environment. Marketing and promotion activities for the Web site (see Chapter 13) usually take place at this time.

Maintenance

A Web site is never finished. There are always errors or omissions that were overlooked during the development process. Clients usually find many new uses for a Web site once they have one and request modifications, additions, and new sections (this is called site **maintenance**). So at this point, the project team identifies the new opportunity or enhancement and begins another loop through the development process.

Other types of updates needed are relatively small—perhaps a link is broken, a word is misspelled, or a graphic needs to be changed. These small changes are usually made as soon as they are noticed. The question of who makes the changes and who approves them is often a matter of company policy. If you are a freelance Web developer, the situation is more straightforward—you will make the changes and your client will approve them.

Evaluation

Remember the goals set for the Web site in the Conceptualization phase? During **evaluation** it's time to review them and determine if your Web site meets them. If not, consider how you can enhance the site, and begin another loop through the development process.

CHECKPOINT 10.1

1. Describe the role of the project manager.
2. Explain why many different roles are needed on a large-scale Web project.
3. List three different techniques used to test a Web site. Describe each technique in one or two sentences.

Consider local Web hosting providers as well as national Web host providers in your search.

FAQ

Why do I care about knowing which operating system my Web host provider uses?

Knowing the operating system used by your Web host provider is important because it can help you with troubleshooting your Web site. Often, students' Web sites work great on their own PC (usually with a Windows-based operating system) but fall apart (with broken links and images that do not load) after being published on a free Web server that uses a different operating system.

Some operating systems, such as Windows, treat uppercase and lowercase letters in exactly the same way. Other operating systems, such as UNIX and Linux, consider uppercase and lowercase letters to be different. This is called being case-sensitive. For example, when a Web server running on a Windows operating system receives a request generated by an anchor tag coded as `<a href="MyPage.html">My Page</a>`, it will return a file named with any combination of uppercase or lowercase letters. The values MyPage.html, mypage.html, myPage.html can all be used. However, when the request generated by the same anchor tag is received by a Web server running on a UNIX system (which is case-sensitive) the file would only be found if it were really saved as MyPage.html. If the file were named mypage.html, a 404 (not found) error would result. This is a good reason to be consistent when naming files—consider always using lowercase letters for file names.

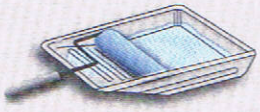
Large- to Enterprise-Size Web Site. If you are expecting a high traffic site that may support a chat room or streaming media content, consider large national Web hosting services. Generally, these provide a high bandwidth Internet connection (typically OC-1 or higher), 24-hour staffing, hardware and media redundancy, and enhanced security. Determine the guaranteed level of service and response time. Also consider using a dedicated or co-located Web server at a national Web host provider. A dedicated or co-located Web server will be running your Web site only—you do not share the processor or hard drive with any other organization. There is an additional charge, but the added security and guarantee of processing may be worth it to your organization.

A **dedicated Web server** refers to the rental and exclusive use of a computer and connection to the Internet that is housed on the Web hosting company's premises. A dedicated server is usually needed for a Web site that could have a considerable amount of traffic, such as tens of millions of hits a day. The server can usually be configured and operated remotely from the client company or you can pay the Web host provider to administer it for you.

A **co-located Web server**, sometimes referred to as colocated or collocated, is a computer that your organization has purchased and configured. Your organization effectively rents space at the Web host provider's location. Your server is kept and connected to the Internet at its location. Your organization administers this computer. This provides your organization with additional control over the Web server, but it also means that you need to staff or contract an individual with Web server administration experience.

Table 10.1 Web host checklist (*continued*)

Uploading Files	❑ FTP Access ❑ Web-based File Manager	A Web host that offers FTP access will allow you the most flexibility. Others only allow updates through a Web-based file manager application. Some Web hosts offer both options.
Canned Scripts	❑ Form processing ❑ _____	Many Web hosts supply canned, pre-written scripts to process form information.
Scripting Support	❑ ASP ❑ PHP ❑ .Net	If you plan to use server-side scripting on your site determine which, if any, scripting is supported by your Web host.
Database Support	❑ MySQL ❑ MS Access ❑ MS SQL	If you plan to access a database with your scripting, determine which, if any, database is supported by your Web host.
E-Commerce Packages	❑ _____	If you plan to enter into e-commerce (see Chapter 12) it may be easier if your Web host offers a shopping cart package. Check to see if one is available.
Scalability	❑ Scripting ❑ Database ❑ E-commerce	You probably will choose a basic (low-end) plan for your first Web site. Note the scalability of your Web host—are there other plans with scripting, database, e-commerce packages, and additional bandwidth or disk space available as your site grows?
Backups	❑ Daily ❑ Periodic ❑ No backups	Most Web hosts will back up your files regularly. Check to see how often the backups are made and if they are accessible to you. Be sure to make your own site backups as well.
Site Statistics	❑ Raw log file ❑ Log reports ❑ No log access	The Web server log contains useful information about your visitors, how they find your site, and what pages they visit. Check to see if the log is available to you. Some Web hosts provide reports about the log. See Chapter 13 for more information on Web server logs.
Domain Name	❑ Required to register with host ❑ OK to register on your own	Some Web hosts offer a package that includes registering your domain name. It is better if you register your domain name yourself (see http://register.com or http://networksolutions.com) and retain control of your domain name account.
Price	❑ _____ Set up fee ❑ _____ per month	Price is last in this list for a reason. Do not choose a Web host based on price alone—the old adage "you get what you pay for" is definitely true here. It is not unusual to pay a one-time set-up fee and then a periodic fee—either monthly, quarterly, or annually.



CHECKPOINT 10.2

1. Describe the type of Web host that would meet the needs of a small company for its initial Web presence.
2. Describe the difference between a dedicated Web server and a co-located Web server.
3. Explain why price is not the most important consideration when choosing a Web host.

5. What do team members do in the Analysis phase of a Web site project?
   a. determine what the site will do—not how it will be done
   b. determine the information topics of the site
   c. determine the content requirements of the site
   d. all of the above

6. In which phase is a prototype of the Web site often created?
   a. Design
   b. Conceptualization
   c. Production
   d. Analysis

7. Which of the following happens during the Production phase?
   a. a Web authoring tool is often used
   b. the graphics, Web pages, and other components are created
   c. the Web pages are individually tested
   d. all of the above

8. Which of the following happens during the Evaluation phase?
   a. the goals for the site are reviewed
   b. another loop through the development process may result
   c. both a and b
   d. none of the above

9. Which Web hosting option is appropriate for the initial Web presence of an organization?
   a. virtual hosting
   b. free Web hosting
   c. dedicated hosting
   d. co-located hosting

10. Which Web hosting option is appropriate for a large- to enterprise-size Web site?
    a. virtual hosting
    b. free Web hosting
    c. dedicated hosting
    d. none of the above

Fill in the Blank

11. _____ can be described as testing how actual Web page visitors use a Web site.

12. The _____ determines appropriate use of graphics on the site, and creates and edits graphics.

13. The _____ operating system(s) treat uppercase and lowercase letters differently.

Short Answer

14. Describe why the Web sites of competitors should be reviewed when designing a Web site.

15. Why should you try to contact the technical support of a Web host provider before you are one of its customers?

Hands-On Exercises

1. Skip this exercise if you have completed Hands-On Practice 2.11 in Chapter 2. In this exercise you will validate a Web page. Choose one of the Web pages that you have created. Launch a browser and visit the W3C HTML Validator page at http://validator.w3.org. Notice the Validate by File Upload area. Click the Browse button, select a file from your computer, and click the Check button to upload the file to the W3C site. Your page will be analyzed and a Results page generated, which shows a report of violations of the DTD that is used by your Web page. The error messages display the offending code along with the line number, column number, and description of the error. Don't worry if your Web page does not pass the validations the first time. Many well-known Web sites have pages that do not validate—even http://yahoo.com had validation errors at the time this was written. Modify your Web page document and revalidate it until you see a message that states "This page is valid XHTML 1.0 Transitional!" (See Figure 10.5.)

published pages to the Web, try validating one of them instead of your school's home page.)

4. NetMechanic offers a free sample of its HTML Toolbox Application at http://www.netmechanic.com/products/HTML_Toolbox_FreeSample.shtml. Visit this site and test your school's home page.After the test is run, a results page will be displayed with ratings related to link check, bad links, HTML check, browser compatibility, load time, and spell check. Each category has a link to a detailed display that describes the types of errors found. Print out the browser view of this results page to hand in to your instructor. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

5. The Dr. Watson site offers free Web page validation at http://watson.addy.com. Visit this site and test your school's home page. After the test is run, a report is displayed with categories including server response, estimated download speed, syntax and style analysis, spell check, link verifications, images, search engine compatibility (see Chapter 13), site link popularity (see Chapter 13), and source code. Print out the browser view of this report page to hand in to your instructor. (*Note*: If you have published pages to the Web, try validating one of them instead of your school's home page.)

6. Perform a small-scale usability test with a group of other students. Decide who will be the "typical users," the tester, and the observer. You will perform a usability test on your school's Web site.

   - The "typical users" are the test subjects.
   - The tester oversees the usability test and emphasizes that the users are not being tested—the Web site is being tested.
   - The observer takes notes on the user's reactions and comments.

   Step 1: The tester welcomes the users and introduces them to the Web site they will be testing.

   Step 2: For each of the following scenarios, the tester introduces the scenario and questions the users as they work through the task. The tester should ask the users to indicate when they are in doubt, confused, or frustrated. The observer takes notes.

   - Scenario 1: Find the phone number of the contact person for the Web development program at your school.
   - Scenario 2: Determine when to register for the next semester.
   - Scenario 3: Find the requirements to earn a degree or certificate in Web development or a related area.

   Step 3: The tester and observer organize the results and write a brief report. If this were a usability test for an actual Web site, the development team would meet to review the results and discuss necessary improvements to the site.

   Step 4: Hand in a report with your group's usability test results. Complete the report using a word processor. Write no more than one page about each scenario. Write one page of recommendations for improving your school's Web site.

   Note: For more information on usability testing, see Keith Instone's classic presentation at http://instone.org/files/KEI-Howtotest-19990721.pdf. Another good resource is Steven Krug's book, *Don't Make Me Think*.

a variety of topics including navigation, text appearance, scrolling and paging, writing Web content, usability testing, and accessibility, Choose one chapter topic that interests you. Read the chapter. Note four guidelines that you find intriguing or useful. In a one-page report, describe why you chose the chapter topic and the four guidelines you noted.

WEB SITE CASE STUDY

Testing Phase

This case study continues throughout the rest of the text. In this chapter you will test the Web Project case study.

Web Project

See Chapter 5 for an introduction to the Web Project. In this chapter you will develop a test plan for the project. You will review the documents created in the previous chapters' Web Project and create a test plan.

Hands-On Practice Case

Part 1: Review the Design Documents and Completed Web pages. Review the Topic Approval, Site Map, and Page Layout Design documents that you created in the Chapter 5 Web Project. Review the Web pages you have created and/or modified in the Chapter 6, Chapter 7, Chapter 8, and Chapter 9 Web Project activities.

Part 2: Prepare a Test Plan. See Figure 10.4 for a sample test plan document. Create a test plan document for your Web site. Include CSS validation, XHTML validation, and accessibility testing.

Part 3: Test Your Web Site. Implement your test plan and test each page that you have developed for your Web Project. Record the results. Write a list of suggested improvements.

Part 4: Perform Usability Testing. Describe three scenarios that typical visitors to your site may encounter. Using Hands-On Exercise 6 as a guide, conduct a usability test for these scenarios. Write a one-page report about your findings. What improvements can be suggested for the Web site?