Chapter 2: GETTING STARTED

There are five major steps in the Practical Web Development process. In this chapter we'll walk through each step briefly and then describe the resources you need to assemble in order to design and build your Web site.

A Quick Walk Through the Basic Steps of Practical Web Development

1. Analyzing Wants and Needs

Begin the design of your Web site by determining who your users and stakeholders are. Users are the primary audiences who will visit your site and stakeholders are all the people (users included) who will be affected in some way by the existence of the site.

Find out why users might be visiting your site and what they expect to be doing there. Find out what goals the stakeholders have in mind for the site, and how their goals might differ from the expectations of your users. Create a definite statement describing the purposes of your site, what it will contain, who will be coming to it, and what they'll be doing there.

2. Paper Prototyping

Create a paper prototype of your Web site on paper. The content of the prototype will emerge from the information you gathered when you were analyzing wants and needs.

We call this prototype a "rapid holistic" prototype. It will be rapid because it will be created on paper in a notebook and not include everything that the final site will include. It will be holistic because it will show the major sections that your site will have along with full detail in one or two sections.

Test the paper prototype with representatives from your target audience. Based on what you learn from these tests, try to fix major problems in your design. Then conduct further tests until it appears that no further major problems have emerged. Begin a draft set of guidelines for standard content and page layout.

3. Computer Prototyping

Build a computer prototype of your Web site that matches the final version of your paper prototype. The organization and amount of the content should not change from your paper prototype, but now is the time to take into account the limitations of computer displays, constraints imposed by the Web itself, and the inevitable differences between linking pages on paper versus linking them on the computer.

Test the computer prototype with representative users just as you did before. Revise and test again until any major problems that surfaced in the computer prototype appear to have been fixed. Begin refining the
guidelines that will be used later to ensure that new additions to the site are consistent with this design.

4. Building the Site

Build your Web site on the computer. During this step you will be extending your computer prototype to include all the detailed content that was left out of your prototype. Include final versions of graphics and other files that may have been mocked-up or missing in the prototype. Now is the time to worry about some technical issues like making sure that files are as small as possible so they load quickly, naming files consistently so they're easy to find, and checking that every page conforms to the guideline standards you've been developing.

Test to make sure there are no technical errors in the files or the content of the site. Test the pages on different computers and different browsers to make sure the pages look good to everyone who will see them. Document your site so that other people can help maintain it later. Make templates of the standard parts of the site so that it will be easy to create new pages.

Publish the site on-line, let other people know it's there, and celebrate!

5. Maintaining the Site

Keep your Web site up and running. No sooner has your team given "birth" to the site than you have to start caring for and feeding it. The site will grow and change over time, and you will have to support it.

Identify the necessary resources to keep the site going. Train people to keep documents up-to-date, add new documents, and troubleshoot when there are problems. Publish the guidelines you've been developing. Set up an ongoing evaluation of the site, and figure out how you will decide that changes are required in the future. Identify a Webmaster who will orchestrate the maintenance effort.

What Am I Going to Need to Do this Job?

To create a useful and usable Web site you need expertise, computing resources, and support from your organization. You can start a Web project with minimal expertise, resources, and support, but it is important to think about where you hope to get more of each one as the project progresses.

Expertise

When you are concerned with the usefulness and usability of your site, you need several sets of skills to work together on designing and building it. Think of constructing a Web site all by yourself as a task similar to designing and building your own home. Many people who have basic carpentry, wiring, and plumbing skills are capable of putting up safe, solid homes that meet the needs of themselves and the people who live with them. The structure may take awhile to get done and a
few compromises may be made along the way, but the resulting home can be exceptionally well tailored to its occupants. And of course, by the time it is finished, the occupants are well versed in whatever its idiosyncrasies might be.

Most of the time, however, the Web site you have to create for your organization will resemble an office building more than it does a single-family home. A lot of different people will have to work safely, comfortably, and happily within the structure once it is finished; the skills required to plan and build the structure will exceed basic carpentry, wiring, and plumbing, and there will simply be too much work involved for just one person to do. You will need to work with a team.

<table>
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<tr>
<th>People working on these aspects of the site</th>
<th>Should be able to …</th>
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| Analysis                                   | • Plan and conduct interviews  
  • Establish rapport with different kinds of people  
  • Record information without interjecting their own viewpoint  
  • Organize information into meaningful, relevant patterns as results |
| Information design and graphic design      | • Categorize, link, and label information  
  • Apply visual design principles to screen displays or templates  
  • Create standards for information types, visual components and editorial conventions |
| Web technology                             | • Know and use HTML  
  • Plan the information structure, types of data and their styles in web documents: e.g., XML, XSL, cascading style sheets  
  • Use a variety of tools  
    • HTML editors  
    • WYSIWYG editors  
    • Graphics programs  
    • Graphics conversions programs  
    • Site maintenance & management software  
    • Unix, Linux, NT operating system  
    • CGI programming: e.g., Javascript, Java, Perl |
| Evaluation / usability testing             | • Plan and conduct appropriate studies for gathering data (observations, paper and pencil tests, interviews)  
  • Establish rapport with different kinds of people  
  • Record information without interjecting their own viewpoint  
  • Organize information into meaningful, relevant patterns as results |
| Web server & system administration        | • Configure hardware and software  
  • Troubleshoot network-related problems  
  • Make proactive plans for avoiding technical errors  
  • Evaluate emerging web technology  
  • Carry out complex operations with the operating system running your server |

Assemble a Team

The skills required to design, build and maintain a Web site are:

- analysis
- information design / graphic design
- HTML (Hypertext Markup Language) and Web technology
- evaluation (usability testing)
When you look for people to join your Web design team, keep in mind the list of skills you need and seek out people likely to have those skills. Don't expect to find most of them already established as Web experts. In fact, in some environments it will be impossible to find people who have even done Web design work before. In other environments you'll find your team handed to you, whether they have the appropriate skills or not. In such cases, look at the experiences people have that might be relevant to this project. People who have created instructional materials of any kind are likely to know how to apply good principles for organizing and presenting information. People who conduct qualitative research or market research may have the evaluation skills you need. People who have used mark-up languages or created complex style definitions for page layout programs should be able to master HTML quickly and easily.

Many people have several clusters of the skills required for Web development, so you don't necessarily have to find one person to match each cluster. In fact, you will have a smaller, more efficient team if you can find a couple people with multiple skills who have some overlap with others on the team. Make these people the "core" of your team, and bring in others who may have aptitude but less experience as the workload gets heavier.

**Define Responsibilities**

Before the project actually gets under way meet with your team to be sure everyone knows which skills each person is bringing to the project. Define the general responsibilities each person will have based on the skills they bring to the team.

You can vary these assignments to fit your circumstances, but typical areas of responsibility might be:

- project direction or coordination
- needs analysis and evaluation (usability testing)
- information design and graphic design
- HTML coding, Web technology, and server administration

Definition of responsibilities does not imply that team members work in isolation, or that a single person on the team makes all the decisions related to one area of responsibility. It does imply that someone on the team is looking out for a certain area of the work with particular interest, and that other team members respect that person's expertise in a particular area. No matter what an individual's primary responsibility is, however, the whole team has to stay in touch with each other and pay attention to the whole design.

**Identify Expert Reviewers**

As the project progresses, you will also need "fresh eyes" to review your design periodically to be sure the content is accurate and that good design principles are being followed. If you have not been able to recruit a lot of actual Web design experience onto your team, you may want to find reviewers who do have such expertise. Identify those experts as early as you can, and enlist their help for the near future.
Look for people who will go over the details carefully and respond to you quickly when you ask for their help. Ask reviewers to tell you when they spot errors of fact, or when they see that you have not conformed to accepted principles of design. But don't rely on experts to tell you what the users will think -- you are going to conduct tests to find that out.

**Computing Resources**

Even though you start out with a paper prototype, you will need computing resources both for developing the site and for building, archiving, and maintaining it.

**Developing the Site**

In general you need better equipment to create computer products, like Web sites, than you need to deliver them. If you are creating graphics for your site the team will need Photoshop (TM), or an equivalent program, and possibly a color scanner in order to produce good-quality images. Marking up the files to produce Web pages is simply faster on a fast computer, especially when that computer is robust enough to run Web editing tools or a word processor with such tools built in. Large screens and ample RAM (computer memory) will allow team members to work efficiently and not waste time waiting for every operation to execute or for documents to scroll back and forth on a small screen. A person waiting even half a second for every basic graphics operation may be wasting as much as a quarter of their working hours just waiting for the computer. They may also make errors when their attention is constantly being pulled away from concentration on their work.

Provide enough common storage space for team members to keep the files they're working on and at least two generations of backup files. Someone on the team should be responsible for copying the backup files to another storage space at least daily so that you don't lose more than one day's work if something happens to the working files. Depending on the size of your prototype and the number of graphics it will contain, the amount of storage space you need may not be great -- perhaps 10 MB or less. The important thing is to make the space available and accessible to everyone who will need to work on the files. Remember that development includes usability testing and testing your site for technical problems. Your team will need access to several different types of computers running several different browsers in order to conduct such tests.

**Publishing, Archiving, and Maintaining the Site**

As a home for your Web site you will need space on a Web server whether the server is your own, one maintained elsewhere in your organization, or one outside your organization maintained by a service provider from whom you "rent" the space. In addition to obtaining space on a server, remember to obtain storage space where you can keep files while you update the site and test new files before publishing them.

You will continue to develop the site even after it's published. You may not need as much equipment for continued development as you do for the initial push to get the site built, but you will have to have
computers that can run the programs you need for creating graphics and editing and managing multiple files.

Support

Since you are reading this book there is a good chance that you already have some support from your organization for creating a Web site. Your challenge is to ensure that this support is aimed in the right direction so that you can do an effective job. We suggest that you educate the people responsible for supporting your project so that they understand what you're doing, why you're doing it, and what results you're getting.

Support for the Process

User-centered design, the software development approach from which rapid prototyping and usability testing are drawn, is still not widely understood or practiced even though it has been heavily publicized in the last six or seven years. Most people have heard about "user-friendly" computing and many organizations claim usability as a central goal for their development efforts. But you may find that when you try to implement the specific methods we describe for Web site development, you meet with resistance and confusion from the very people who are encouraging you to make your site friendly.

You may hear some, or all, of the following questions:

- "Why are we looking at our old information systems when we're trying to do something new -- won't that limit our thinking?"
- "Shouldn't we be creating the site directly on the computer instead of wasting time by making a paper prototype? What can you tell from paper anyway -- the Web is interactive."
- "How can we learn anything by testing with so few people? It won't tell us anything."
- "Why aren't we using the newest, hottest tools? We have to compete with all the other sites on the Web, after all."

These are common misgivings arising from the difference between the processes people are used to and the Practical Web Development process. As you read this book you'll find answers for the questions you may be asked, and it will be a good idea to explain the reasons behind your process to as many stakeholders as you can identify.

You may not get enthusiastic support for the whole process all at once. In fact, you almost never get whole-hearted support from skeptics just by reasoning your case. The faster you can begin collecting information from potential users or testing prototype designs, the sooner you will have data in hand which you can use to demonstrate the value in this process. Don't be surprised to find that your stakeholders are soon quoting results from a test that they only reluctantly agreed to in the first place. When that happens, you know you have support for your process.
Support for the Team

Support your team by making it easy for them to report their results and record their design decisions as they go along, perhaps by publishing them to an unpublicized Web page.

With easy access to these documents from anywhere they were working, everyone involved in the project can stay up to date individual team members don't have to spend a lot of extra time preparing paper documents for each other.

Support for and from Information Providers

Information providers are all the people who will have to supply content for your Web site during the development process and later, after the site is published. These are often the people who handle information in its current, non-Web form. In most organizations information providers are a distributed group of people for whom their Web responsibilities are an addition to, or a change to, jobs in which they have already been disseminating information. Most Web sites will not survive very long without the active, coordinated support of information providers. All of them will want to know what the project means to them in the way of expectations for how they will prepare and disseminate information in the future.
Your team needs to identify as many content providers as you can now, so that you can keep them informed as you go along. When you are interviewing people to find out about the content that goes into the site, save the names of the people who will probably be publishing that content to your Web site later on. Send them updates on the work of the team, or ask them to be reviewers of your prototypes. Show them the guidelines you are developing and ask for their reactions.
The Original IUB Site

In early 1995 the main page of the Web site at Indiana University Bloomington (IUB) consisted of a list of 25+ links. The webmasters at University Computing Services (UCS), the central computing facilities, knew that requests for more links would continue to be made. They had no basis except their best judgement for reorganizing the page each time a new link needed to be added – and of course, each new link was considered by its owner to deserve a place near the top of the page!
Starting the Redesign Effort

UCS appointed a staff person to assemble a committee from across the campus. The committee worked under a request from the Vice-President for External Relations to remodel the IUB top-level Web pages. The initial committee grew over time and ultimately included:

- IUB webmaster
- IUB Web site manager
- Representatives from the Office of External Relations
- IU publications (print)
- The IUB libraries
- Admissions office
- Faculty from Fine Arts, Telecommunications, Instructional Systems Technology, Library and Information Science

What Next?

The committee recognized that identifying the target audiences for the Web site was the first order of business, and after considerable argument and discussion they settled on:

- Prospective IU students
- The parents of prospective IU students
- Current students at IUB
- Faculty and staff at IUB
- Alumni

After making this decision the committee of 20+ people turned its attention to decisions about the contents and look of the top level pages for the site. Committee members looked at other sites on the web, shared printed copies of favorite academic sites, and began to argue about which ones represented the best model from which to work. Although many reasonable ideas were put forward, there were so many perspectives represented on the committee that power struggles began to look inevitable.

At this point Dr. Ted Frick suggested conducting a needs analysis to discover what the target audiences needed and wanted from the site. He further proposed the creation of rapid prototypes to be tested with members of the target audiences, and the committee agreed to let him direct this effort as a means of arriving at a design.

Needs Analysis

I came into the project along with ten other masters and doctoral students in Instructional Systems Technology (IST) when Ted asked for volunteers to help with the needs analysis and usability testing of prototypes. We became the design-research team, a sort of subcommittee to the HomeRemo Committee, and embarked on an exciting opportunity to apply the design and inquiry skills we were learning in class to a real project that would directly impact the architecture of the IUB web site.

Our needs analysis took about two months. To begin, I identified the front-line information providers in approximately 35 major offices and units around the campus, most often the receptionists who answered phones and greeted walk-in traffic. We obtained permission from these information providers’ supervisors to have them provide us with a list of the ten questions they were most frequently asked. They also estimated the frequency with which they were asked each question. We interviewed each information provider to review the list and to collect the answers to the questions they listed.

Original Design

The design-research team compiled all these lists, eliminating duplicate items by combining their frequencies. The remaining 339 questions we copied onto individual index cards and sorted into discrete topics. We identified topics by handling the cards, moving them around on a big table, proposing and discussing possible categories with each other as we read and reread all the cards.
Here are some examples of those questions:

- How do I get housing?
- What is the status of my IUB application?
- Please send (information on courses, bulletin, application, schedules).
- What is needed to complete financial aid forms? What is the application procedure?
- When will I be assigned an advisor?
- What requirements do I still have to complete to graduate?
- I want tickets to the _____ game.
- What is the phone number of ______?
- Where can I pick up my registration ticket?
- Can I get my electronic student locker quota increased?
- What kind of a job can I get with my major? What kind of major do I need to get this job?

We identified something over 30 categories initially, and then recognized six broad categories into which the 30 might be grouped. They were:

- Attending IUB – the Basics
- Academic Programs and Research
- People at IUB
- Recreation, Entertainment and Tickets
- Services Used Often
- General Information

These categories became the primary links on the top level page for the paper prototype we built next. We also created “satellite” pages, or second- and third-level pages, for that prototype, placing the content items in each category on those pages in the order of frequency that information providers had reported for them.

**Usability Testing and Redesign**

Armed with our new prototype, a paper copy of the existing site, and our list of 339 frequently-asked questions, we planned and conducted a comparative usability test. The ten of us each took a paper version of either the old or the new design. We identified members of the target audiences for the IUB site and asked them to find the answer about 30 questions we had gotten from the information providers. We divided the questions so that all of us asked some of the most frequent questions, while each of us asked separate sets of the less frequent questions. We asked these members of the target audience to think out loud as they searched through the paper prototype, and we noted the paths they took as well as the comments they made.

Our first usability tests showed clearly that when people were looking for the kind of information reported to be sought most often on the campus, the new prototype design worked better than the original site. We went on to revise the paper prototype of the new design based on problems revealed by the usability test. We continued testing and revising until the problem areas revealed in the new prototype were resolved.

We created a computer prototype of the new design and continued testing it in our third month of work. At this stage we naturally discovered some design issues that are not testable in a paper prototype. In particular, there were problems for text-based browsers (still used by a large audience at that time). The spacing and labeling of links on all browsers also turned out to be an important issue. We developed three variations of our design and continued testing. One of the designs performed slightly better than the others consistently, and this is the design we recommended to the HomeRemo Committee. They adopted the design, and used our data to settle some disagreements that arose later over the placement of content in the top level of the new site.
Throughout the Whole Project, the Design-research Team Used Our Initial Needs Analysis Data to Provide the Most Relevant Tasks for Usability Testing.

Those 339 questions were the ones that information providers on campus reported as having been asked multiple times per day or per week – in some cases over 5,000 times a week. If our site could not support people looking for this information, we knew it would not serve the needs of our audiences! Needs analysis drove the original design, allowed us to test our prototypes with confidence, and helped the HomeRemo team resolve differences of opinion regarding the relative importance of information that different campus constituencies wanted to place into the site.

The HomeRemo team adopted our design and published the new site online with some additional graphics in October, a total of six months after the needs analysis was begun. For a full paper describing the design-research team’s work, see:

- The design-research team’s online report – http://education.indiana.edu/ist/faculty/iuwebrep.html
Michael Corry is currently an assistant professor at George Washington University. He has been leading efforts in distance education the past several years and has developed several successful Web-based courses.

Now That I Have a Team, Computer Resources, and Support from the Organization, What Do I Do Next?

Figure out what you and your target audience will want and need from your Web site. Start with a preliminary goal statement that says, "We could solve our <information/instruction problem> by putting the information on the Web." Then find out how people are getting that information now (if they are), what will be the most useful way for them to get it from your site, and where they might expect to find it when you do put it on the Web. The next chapter takes you through these steps in detail.