Web Site Usability:  
A Designer’s Guide

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Part 1: Research Results

Everyone has opinions about what makes a good website. Web site navigation, links, graphic design, page layout, and user satisfaction have all been discussed in the popular press ad nauseam.

Our research, however, provides actual data — not opinions — about what makes web sites usable. You may be surprised at some of our findings. We certainly were!

The chapters in Part 1 present the most interesting findings from our research. We don’t have all the answers about how to design a usable web site, but we’re starting to learn where some of the problems with current web site design lie.

As an industry, we have a long way to go.
surfing? Doing research? Buying products? Downloading software? And it also depends on the organization's goals for creating the web site. Is the site aimed at marketing a service? Selling merchandise? Making information available to employees, shareholders, and customers?

Whatever the goal, information is a central theme. For intranets (internal web sites), information is the theme — no one surfs the online employee policy manual just for kicks. Because of this, we focused our study on how successful sites are at providing people with information so they can make decisions. The more a site helps people find the information they are looking for, the more usable it is.

**The Sites We Tested**

We picked a set of nine popular sites with content we thought would be useful for a general audience, as shown in Table 1.1. Two of the sites, Disney and C|net, were high-profile sites that had been well-reviewed by the media. We expected that these sites would do the best, and that we could learn from them about successful web site design.

True to the ever-changing nature of the web, two of the sites were updated in the middle of our study. The Disney site changed to a frame-based design, and the layout of Inc.'s home page also changed. We collected enough data to include both versions in our findings. To our dismay, the Olympic site (which had done well in our study) disappeared before we could obtain screen shots for this report.
<table>
<thead>
<tr>
<th>Site Name</th>
<th>Content</th>
</tr>
</thead>
<tbody>
<tr>
<td>C</td>
<td>net</td>
</tr>
<tr>
<td><a href="http://www.cnet.com">www.cnet.com</a></td>
<td></td>
</tr>
<tr>
<td>Disney</td>
<td>Games, videos, merchandise, Disneyland and Walt Disney World theme park information and reservations.</td>
</tr>
<tr>
<td><a href="http://www.disney.com">www.disney.com</a></td>
<td></td>
</tr>
<tr>
<td>Edmund's</td>
<td>Car and truck prices, specifications, reviews, and other resources for vehicle buyers</td>
</tr>
<tr>
<td><a href="http://www.edmunds.com">www.edmunds.com</a></td>
<td></td>
</tr>
<tr>
<td>Fidelity</td>
<td>Fidelity mutual funds, personal and corporate investing opportunities.</td>
</tr>
<tr>
<td><a href="http://www.fidelity.com">www.fidelity.com</a></td>
<td></td>
</tr>
<tr>
<td>Hewlett Packard</td>
<td>Product information, financial information, job opportunities.</td>
</tr>
<tr>
<td><a href="http://www.hp.com">www.hp.com</a></td>
<td></td>
</tr>
<tr>
<td>Inc.</td>
<td>Small business resources, book reviews, articles, conferences, contact information for organizations.</td>
</tr>
<tr>
<td><a href="http://www.inc.com">www.inc.com</a></td>
<td></td>
</tr>
<tr>
<td>Olympics</td>
<td>Schedules and results from the 1996 Olympic summer games in Atlanta, merchandise, tickets.</td>
</tr>
<tr>
<td>[No longer available]</td>
<td></td>
</tr>
<tr>
<td>Travelocity</td>
<td>Airline tickets, car and hotel reservations, guide to recreational activities world-wide.</td>
</tr>
<tr>
<td><a href="http://www.travelocity.com">www.travelocity.com</a></td>
<td></td>
</tr>
<tr>
<td>Websaver</td>
<td>Annuity information.</td>
</tr>
<tr>
<td><a href="http://www.websaver.com">www.websaver.com</a></td>
<td></td>
</tr>
</tbody>
</table>

**Table 1.1**

We studied nine different web sites. Two of them, Inc. and Disney, were redesigned in the middle of the study.

**"Scavenger Hunt" Tests**

All these sites, while obviously trying to sell products, also provide information. Because we wanted to learn how easy it was for users to answer questions on these sites, we set up a "scavenger hunt" usability test.
We brought in users who were familiar with a web browser, sat them down in front of a site and watched them try to answer four types of questions, as described in Table 1.2. They had to hunt through the site to find the answer, even if they already knew it. We wanted to see how they searched and what factors of the site helped or hindered them.

<table>
<thead>
<tr>
<th>Type of Question</th>
<th>Examples</th>
</tr>
</thead>
<tbody>
<tr>
<td>Simple Facts</td>
<td>Is there any place to go horseback riding on the north shore of Boston? (Travelocity)</td>
</tr>
<tr>
<td></td>
<td>Can you get a Honda Accord for under $15,000? (Edmund's)</td>
</tr>
<tr>
<td>Comparisons of Facts</td>
<td>Which is cheaper to fly to, Nevada or England? (Travelocity)</td>
</tr>
<tr>
<td></td>
<td>Which has better acceleration, the Jeep Cherokee or the Toyota Land Cruiser? (Edmund's)</td>
</tr>
<tr>
<td>Judgment</td>
<td>Would you like to go on a day trip to Hampton Court? (Travelocity)</td>
</tr>
<tr>
<td></td>
<td>Do you think a used Ford F-10 is safe enough? (Edmund's)</td>
</tr>
<tr>
<td>Comparison of Judgment</td>
<td>Which show would you like to go to in London with your nine-year old niece? (Travelocity)</td>
</tr>
<tr>
<td></td>
<td>Which convertible is the best deal for under $20,000? (Edmund's)</td>
</tr>
</tbody>
</table>

The Results

Searching for information on web sites is an intensely frustrating experience. Throughout our study, we were amazed by the time and effort it took users to answer even simple questions. And repeatedly, users gave up without ever
finding what they were looking for. Even in the smaller web sites, we watched users get lost or wander off the site without being aware of it.

The Rankings

After more than 50 tests, we have a good idea of how our sites compare to each other. The results are startling. Disney and C|net — the sites we expected to do best — fared poorly in our study. Edmund’s, which none of us would have bet on, came in first. Figure 1.1 shows how the sites compared.

![Figure 1.1]

The relative rankings of the nine sites in our study, based on how successful users were at finding information.

Room for Improvement

Comparing the sites to each other tells only part of the story. Even Edmund’s, the best site in our study, fell far short of the highest possible score. Clearly, when it comes to web site design, there is room for improvement.

![Figure 1.2]

The entire scale, illustrating how much room there is for improvement in web site usability.

For designers, this is actually good news. Many people we’ve talked to know that their sites have usability problems, but don’t know where to look to begin fixing them. In the course
of our research, we gained some insight into which aspects of site design can help or hinder users the most.

**Beyond the Rankings**

After looking at the site rankings, our ideas about successful web site design were turned completely upside-down. To find out why, we began scrutinizing the sites themselves, looking for similarities and differences that might account for the users' success or lack thereof. We used a statistical model to discover which factors were most correlated with user success.

There were lots of surprises. When we found things that flew in the face of common sense and the recommendations of other designers, we did more tests to get more data. We even conducted some parts of the analysis two or three different ways, and got the same results.

Later chapters describe our findings in detail. But first, let's look at some of the high-level implications of these results.

**The Major Implications**

Some of results of our study are counter-intuitive, but what makes our research both controversial and fascinating are its implications. These results could dramatically change the way people develop web pages.
Implication 1:  
Graphic Design Neither Helps Nor Hurts

As hard as we looked, we couldn’t find any evidence that graphic design helps users retrieve information from a site.

Consider the following:

- We measured all the graphic design elements we could think of, and none of them had any significant correlation — either positive or negative — with users’ success (for more information, see Chapter 7, Graphic Design on the Web).
- Several of the sites had very professional-looking designs. The Hewlett Packard and Olympics sites did well, while C|net and Disney — also graphically intense — scored at the lower end of our ratings.
- Edmund’s, the top-scoring site in our study, is mostly text.
- When users navigated, they often tried text links first, ignoring nearby graphics.

Of course, graphics may be important in other ways, such as for conveying marketing messages, making users more willing to return to the site, or selling products. We didn’t measure these, so we don’t know. But as far as we can tell, graphic design is completely unrelated to success at finding information on web sites.
Implication 2: 
Text Links Are Vital

In watching users work with the sites, we couldn't help notice how important text links are. Because of downloading delays, text links are often the first things visible on the page. Most users examined text links before considering image links.

There are many different types and styles of links, and some styles do seem to work better than others (for more information, see Chapter 3, Getting Around: Links). More important than style, however, is the predictiveness of the link. The better users could predict where a link would lead, the more successful they were in finding information.

The text link is the way users prefer to navigate sites. Yet, very little of the design advice available talks about how to create effective text links. This is clearly an area for further study.

Implication 3: 
Navigation and Content Are Inseparable

We've heard a lot about the shell strategy — a technique that lets designers design a navigational structure and hierarchy first, then just plug the content into it. For example, one of our clients (a large multinational bank) has one department working on the overall look and feel of the site, including the home page, navigation bars, style sheets,
and templates for different types of interactions. Other departments are responsible for creating the content. The developers of the overall structure — or shell — don’t know what the content will be because it will be plugged in later.

When we were doing our research, we didn’t talk with any of the site developers, but saw a few shell sites nonetheless. (Our rule of thumb for identifying shells is this: If you could remove more than half of the site content without having to update the home page, it’s most likely a shell site.) Inc.’s home page is one example, as shown in Figure 1.3. The links are so generic that users rarely got what they expected.

**Figure 1.3**
This detail from Inc’s home page shows how it fits our definition of a “shell site,” because it contains so many generic links.
Based on our observations of Inc. and other shell sites, we have no evidence to suggest that the shell strategy can succeed. The sites that were most successful were those where content and navigation were inextricably linked — where you couldn’t remove content without updating all of the main navigation pages.

The problem with shells is that by definition they require lots of generic links, which make it harder for users to predict what they will find. This implication makes development of large web sites significantly more difficult, because it suggests that the home page and high-level links may need to change more frequently.

**Implication 4: Information Retrieval Is Different than Surfing**

Our study focused on one specific activity: information retrieval within a large site. We didn’t study surfing, the other primary use of web sites. When users surf, they are just browsing, clicking whatever looks most interesting or “cool,” and content may not be the driving force in coolness.

In the movie *Wayne's World*, there is a scene where Wayne opens a door in a local donut shop to reveal a troupe of black-clad warriors practicing martial arts. He watches them for a moment and then shuts the door, proclaiming “I’ve always wanted to open a door and see a bunch of guys Kung-Fu fighting.” The scene is completely irrelevant to the rest of the movie — it’s just cool. When users surf the web, they’re looking for the guys who are Kung-Fu fighting.
When looking for information, users are much more focused. They tend to click on the link most likely to yield the information they’re hunting for. The kinds of things designers put on web sites to attract surfing users proved to be distractions during information retrieval tasks. For example, users saw advertisements as visual “noise,” and animation was so irritating that some users covered it up!

This implies that sites aimed at information retrieval need to be designed differently from sites aimed at surfing. These are conflicting goals. Unfortunately, we don’t yet have all the answers about where the differences lie.

**Implication 5:**
**Web Sites Aren’t Like Software**

Companies have been usability testing their software products for years. Our firm alone has conducted thousands of usability tests on hundreds of software and hardware products. We’ve learned a lot about measuring usability. We assumed that the web sites would just be another form of software, and could be tested similarly.

Boy, were we wrong! The web presents lots of problems that we’ve never seen before, which make it hard to define what usability even is, let alone measure it.

Consider user preference. When we do comparative testing, we ask users which product they like the most after they’ve worked with all of them. Almost without fail, users choose the same product that they were most successful with. For
software, we’ve found that user preference can be a reason-
ably good proxy for measuring usability.

This is not true for web sites. We asked users to pick which site they liked the best. While some people chose the site they were most successful with, others did not. These users liked a site because of its content, rather than the site’s ability to help them find information. They’d say things like “I liked Disney, it seemed more interesting,” even if they had gotten completely lost and failed to complete any of the tasks.

For web sites, user preference obviously doesn’t measure the same things it does for software, so our tried-and-true proxy suddenly doesn’t work any more. And the more data we find, the more we realize we don’t really know what makes a web site usable.

The web is a whole new ball-game, and we’re still learning how to play. We don’t yet know how to design for finding information. We don’t know how to design for comparisons so that users can find the best house, car, or job — things the press tells us the web excels at. We don’t know how to effectively use multiple media like graphics, animation, interactive applets, and text to produce the best results.

To web site designers, this probably doesn’t feel like good news. But with this study we now have some insights we never had before, and we hope that our results will inspire further research into all these areas.
Getting Around: Navigation

Like most aspects of usability, navigation is invisible when it’s working. But when there’s a problem, users can get completely stuck. In fact, navigation problems frequently caused users to give up.

The problems we saw were primarily due to two things:

- Users did not have the domain — or business area — knowledge they needed to navigate the site
- The site structure didn’t meet users’ expectations

We also looked at some of the devices that designers used to help users traverse their sites: frames, tables of contents, and so on. (We looked at links also, and found that they deserve their own chapter. For more information, see Chapter 3.) Some of these devices helped, and some didn’t. You might want to check them out before you put lots of effort into implementing them for your site.
Domain Knowledge and Navigation

Some of the sites we tested, such as Travelocity and Fidelity, assumed that users had a lot of detailed knowledge about the domain — or business area — covered by the site. These sites tended to finish low in our ratings because users didn’t have the knowledge they needed. When users aren’t familiar with the domain, they don’t understand the options that are presented to them.

High-ranking sites such as Hewlett Packard and Edmund’s did not assume domain knowledge. In fact, where there was possible confusion, these sites put in explicit navigational cues. Let’s look at some examples.

The Domain of Travel

The 3 Best Itineraries section of the Travelocity site (see Figure 2.1) appears to be designed from a travel agent’s point of view. The system expected users to enter a round-trip destination (Boston to London, then London to Boston). However, several users tried to compare two flights to two different locations at the same time, such as Boston to Las Vegas and Boston to London. To these users, having multiple fields implied they could enter different information.

The site assumed that users understand the basic paradigm of booking travel. Users didn’t realize that they were booking segments of a trip, most likely because of the terminology. The term segments is familiar to a travel agent but had little meaning to most users, who thought in terms of round trips.
Recently, the Travelocity site was changed to include a "Round Trip" check box, as shown in Figure 2.2. No one has had problems with the concept of segments since this change was made.

The Investment Domain

The Fidelity site assumes that users are knowledgeable about investing. When users were searching, they had to specify which parts of the site to search, as shown in Figure 2.3. Unfortunately, most users couldn’t determine whether they should search Fidelity Mutual Funds, Fidelity Daily NAVs, or Personal Investing. In fact, users couldn’t explain the differences among these three categories. In this case, a lack of domain knowledge made the site unsearchable for them.
Search allows you to find all documents on our site containing the word or phrase entered in the field below. You can use parentheses, boolean (AND, OR, and NOT), and wildcards.

For example you could select Fidelity Mutual Funds, enter Microsoft in the Keywords field, and hit Begin Search. The site would then return a list of all Mutual Funds that have as one of its top ten holdings as of a certain date Microsoft.

Choose Search Area:
- Fidelity Mutual Funds
- Fidelity Daily NAVs
- Personal Investing

Enter Keyword(s):

Maximum Documents to Return: 25

[Begin Search] [Reset Search]

The Automotive Domain: Linking Content and Navigation

The Edmund's site does a better job of linking content and navigation. Several users did not know whether a Jeep Grand Cherokee was a car or a truck. The site designers had anticipated this confusion, however, and included a link on the New Cars page saying "For New Pickup, Van and Sport Utility prices, click here!" as shown in Figure 2.4. Because content and navigation were developed together, users were more successful with the site.

Web Sites May Have Different Users

We think some of these domain issues arose because the designer assumed the site user was the same as the user for the company's flagship product or service. But this may not
be the case — web site users may be different than typical users of the product.

For example, Travelocity is produced by Sabre, the same company that creates the reservation systems used by trained travel agents. Fidelity's software products are used by investment-savvy individuals and professionals. The readers of Inc. magazine are business owners and entrepreneurs. In all these cases, the typical user of the product knows a particular domain. But the web site audience may be quite different from the audience the company usually designs for.

This is only a theory — we didn't talk to the site designers, and the users we tested may be different from the population the site was intended for. However, the fact that Travelocity now supports the concept of round trips suggests that the Travelocity designers may have come to the same realization.

The Structure of Sites

"A well-defined structure... provides users with an obvious, clear model of the information space."

— Darrell Sano

Designing Large-Scale Web Sites

When we started looking for sites to test, one thing we looked for was sites that used different navigational structures. We thought that there must be one structure that would work better for users than others. Perhaps a star structure would work, or maybe a sequential structure
would be best. Surprisingly, however, we found that the structure of the site made little difference in whether users would be successful.

**Users Don’t Form Mental Models of Sites**

In software applications, users form mental models of the product — how it works and where the functionality is located. We expected that users of web sites would do the same thing: they’d form a mental map of how the site is laid out and how the information is organized. If users did map out the site, we would expect them to use the browser’s Go menu if they got lost to quickly get back to a known point. Because they had a mental map, they could return to the point where they made a wrong turn and try a different route.

But none of our users did this. When they got lost, they went forward from where they were, navigating “in the moment.” They often could not tell us what the problem was or where they had gone wrong. We didn’t see any evidence that users ever attempted to understand the layout of the site. Users apparently don’t think about site structure at all. Instead, they continue on an exploratory path through the site until they find what they’re looking for or become so frustrated that they give up.

**Content and Navigation: Shells**

Many of the books about web design imply that you can design a navigational structure and hierarchy — sometimes called a shell — and then just plug the content into it. But after watching users struggle with content and navigation
issues, we feel these are so closely intertwined that attempting to separate them will lead to a less effective design.

The reason has to do with the links. By definition, the links used in a shell structure are generic so the underlying content can be modified or added to without changing the high-level structure. Unfortunately, these less-descriptive links made it harder for users to decide what path to pursue. (For more information about links, see Chapter 3, Getting Around: Links.) And if it's true that users navigate in the moment, they may not ever really learn the structure of the site, making every search for information a new guessing game.

**Subsites**

Users got lost most often in the Disney sites. We believe the problem has to do with the structure. Disney has both a main site and several subsites, as shown in Figure 2.5. Users had different expectations from the site designers of where "home" would take them.

![Diagram of Disney.com structure](image)

Notice that from the main site, disney.com, users could get to the subsites, but unless they were willing to use their browser's Back button or could find the magic link, they...
could not return. (In the old Disney site, the magic link was a set of mouse ears in the upper corner of the page.)

If users were on a page in a subsite and clicked the home link, they would return to the subsite’s home page, not disney.com’s home page. In fact, we had several users who were lost in the Disneyland subsite, because they could not get to the Walt Disney World subsite where the answers were.

**Devices for Navigation**

We also looked at some of the tools, techniques, and tricks that site designers used to help users navigate. Some of these devices were more successful than others.

**Device: Frames**

Frames, an HTML construct for dividing the browser window into several areas that can scroll and otherwise act independently, have a reputation for causing usability problems. Each frame can display different documents, thus it’s possible to change the content of one area without changing the entire window. Many sites use frames to help with navigation, putting a small frame on one side with a table of contents, and a larger frame next to it, where the content is displayed.

Only two of the sites we tested used frames, but the issues we saw were not as significant as we expected them to be. In
fact, we were lucky enough to test two versions of the Disney site. The old version did not use frames, but the new one did, as shown in Figure 2.6. The small pane on the right side is a table of contents. Users could click on something in that pane and it would appear in the larger left pane. Thus the table of contents frame was always visible.

Users performed significantly better with the new site than they did with the old. There were other changes to the site as well, so we can't credit the improvement to frames alone. But, as far as we can tell, frames did not hurt the new Disney design.

**Figure 2.6**
The new version of the Disney site used frames: (1) is the main content area, (2) is the main table of contents, and (3) controls what's listed in the table of contents. As far as we can tell, frames did not hurt the site.
That's not to say that frames are problem-free. One of main drawbacks we saw pertains to the subtle changes when one frame scrolls to new content.

On the Fidelity site, shown in Figure 2.7, when the user clicked an item in the left frame, the text frame would scroll to that section. However, users didn't always notice that something on the screen had changed so they'd click again. Several users thought the server was down because it didn't seem to respond to their input. This was less of an issue when there was an image on the screen, because the change was more obvious than when it was just text. We didn't see this problem with the Disney site, where the change in the large frame is also quite obvious.

**Figure 2.7**

When users clicked on an item in the left frame of the Fidelity site, they didn't always realize that the content of the large frame had changed.

<table>
<thead>
<tr>
<th>Fidelity mutual funds</th>
<th>mutual funds</th>
</tr>
</thead>
<tbody>
<tr>
<td>Fidelity offers daily NAVs for all Fidelity mutual funds, except money market funds, as well as current asset values to help you track your investment.</td>
<td></td>
</tr>
<tr>
<td>In this area, you can review descriptions and performance information on more than 150 Fidelity money market, income, equity, and asset allocation mutual funds. If you're new to mutual funds investing, you might want to review our definitions of these fund categories, or visit the Mutual Fund Reference Room to learn more about putting together a mutual fund portfolio.</td>
<td></td>
</tr>
<tr>
<td>Fidelity also offers a Select® line of fixed income funds for investors who are seeking higher yields through lower transaction fees and operating costs.</td>
<td></td>
</tr>
<tr>
<td>Once you find a fund you're interested in, you can order a prospectus and application using an electronic form. If you live in the U.S., these materials will be mailed to you within three business days of your request. In accordance with SEC regulations, prospectuses may contain more information about the products and services available to them.</td>
<td></td>
</tr>
<tr>
<td>You may also want to take a look at more than 200 mutual funds representing some of America's popular fund families that can be purchased without a transaction fee through Fidelity National Network.</td>
<td></td>
</tr>
<tr>
<td>Please be aware that some of the funds and services described in this area may not be available or appropriate in your workplace retirement plan. Check with your employer for information on any investment restrictions associated with your 401(k) or 403(b) savings plan at work. Or, if you already have such a plan with Fidelity, call your rollover retirement benefits line.</td>
<td></td>
</tr>
</tbody>
</table>
Device: Table of Contents

A table of contents is (usually) a hierarchical listing of the items in the site. Several sites used a table of contents as a navigational device.

The Edmund’s home page itself is organized as a table of contents, as shown in Figure 2.8. As with a book, users could look at the home page and know what they would find in each section. Notice that the table of contents also has main categories and subcategories, much like book chapters.

Both versions of the Disney site provided a table of contents. In the new Disney site, the right-hand frame functions as a high-level table of contents. There is also a table of contents that is organized like a traditional index in a book, as shown in Figure 2.9. The entries are hierarchical, but organized in alphabetical order. The table of contents is several pages long, and quite detailed. A couple of users navigated the site
successfully using the table of contents, though many others ignored it.

**Figure 2.8**
The table of contents on the new Disney site is organized alphabetically.

**DISNEY.COM**

<table>
<thead>
<tr>
<th>E-mail</th>
<th>Help</th>
</tr>
</thead>
<tbody>
<tr>
<td>Applications</td>
<td></td>
</tr>
<tr>
<td>Audio</td>
<td></td>
</tr>
<tr>
<td>Error Messages</td>
<td></td>
</tr>
<tr>
<td>Frequently Asked Questions</td>
<td></td>
</tr>
<tr>
<td>Getting Around</td>
<td></td>
</tr>
<tr>
<td>Passwords</td>
<td></td>
</tr>
<tr>
<td>Pictures</td>
<td></td>
</tr>
<tr>
<td>Shopping</td>
<td></td>
</tr>
<tr>
<td>Video</td>
<td></td>
</tr>
<tr>
<td>Registration</td>
<td></td>
</tr>
</tbody>
</table>

**Star Watch**

- 101 Dalmatians
- Pocahontas
- The Hunchback of Notre Dame
- The Lion King
- Toy Story
- Winnie the Pooh

**DISNEY CHANNEL**

**Featured Shows**

- A Dinosaur's Story
- An American Tail
- Angels in the Outfield
- Audubon's Animal Adventures
- Flash Forward
- Good Troupe
- Heavyweights

**Device: Navigation Bars**

Sites with navigation buttons or links at the top and bottom of pages did slightly better than sites with navigation buttons down the side of the page. For example, the Hewlett
Packard site has a navigation bar at both the top and bottom of each page. Figure 2.9 shows the bottom buttons.

We're not exactly sure why navigation bars at the top and bottom are better than navigation at the side, but we have some hypotheses. First, side navigation bars are subject to scrolling problems. Users can scroll them off the screen, or lose context because they only see part of the navigation bar.

Also, users seem to want to use navigation bars after they've determined that the page won't give them what they need. That's often after they've scrolled to the top or bottom of the page. It's very convenient to have a navigation bar staring them in the face at that point.

**Device: Hierarchical Maps**

Several users got confused because they didn't know exactly where they were in the site's hierarchy. For example, the Olympic site used an imagemap as table of contents for the site, with scaled-down versions of the map as a navigational aid at the top of each page, as shown in Figure 2.10. Some users were confused by these second-level maps. They clicked on the map section they were already in, which in some cases took them several levels up in the hierarchy.
The Olympic site put a navigational imagemap at the top of the page. Because there's no good indication of where users are in the site, they often clicked on the section they were already in.

The imagemap did not visually indicate which section users were currently in. Text links generally change color after they've been visited, but this image did not. We wonder whether a more explicit "You are here" indicator might have alleviated this problem.

This problem provides additional evidence for our theory that users don't form mental site maps. If they did, they'd know where they were at any given moment.

**Device: "You Are Here"**

The C|net site attempted to help users keep track of where they were in the hierarchy. Each page included a series of connected buttons, as shown in Figure 2.11. The first button was the top level of the hierarchy, and subsequent buttons listed the other levels. We expected that this would help people track where they were, but only one user gave any indication of seeing it.
Device: Site Maps

Site maps are visual representations of the content of the site. The only site we tested that had a site map was Fidelity, as shown in Figure 2.12. The users who used Fidelity’s site map were twice as successful at finding answers on that site as the users who did not. While we don’t have enough data to recommend that all sites have maps, it might be worth investigating further.

![Site Map Diagram]

We believe this site map works because it gives users more information about where the links lead. For more details about the importance of understandable links, see Chapter 3, Getting Around: Links.

User Navigation Tactics

In the course of our testing, we saw some tactical patterns in the way people navigated while looking for information.
Note that these categories are not mutually exclusive; users often tried several different tactics.

**Searching**

About one-third of our users always tried to answer questions by going to the site's search facility. A couple of sites didn't have a search tool, and we saw one user give up on a site because of this. Also, this tactic did not always lead to success, given the problems discussed Chapter 4, Within-Site Searching.

**Just the FAQs**

Another tactic users tried was going to the site's Frequently Asked Questions (FAQ) list. In general, this was effective except on the Disney site. Unlike the other sites we tested, the Disney site gave you a different FAQ depending on where you were in the site. So if a user was in Help and requested the FAQ, the site returned a list of the frequently asked questions about Help. This puzzled users — they only expected one FAQ per site.

**The Back Button**

Many people used the browser Back button to go back one or two pages. Interestingly, if something was further back, most users would try to use the page navigation to get there instead.

Several users didn't use the Back button at all. We think they either didn't know about it or forgot it. They occasionally ran into trouble when they went to a page that had no
links off it. To get unstuck, they used the bookmark we had created to the home page and started over from scratch.

**Backing Up to Advance**

In some instances, users returned to the site's home page to choose a link, even though that same link was available on the page they were on. We aren't sure why they did this, but it might be because they remembered seeing the link on the home page.

We've also seen users exhibit similar behavior when testing other types of software. Starting from a known place may help keep users from getting lost, or at least that's their perception.
Getting Around: Links

Links are closely tied to navigation. While navigation refers to the structure of the site and the patterns by which users traverse the site, links are the mechanism by which they move from one place to another. Successful link structures can help users navigate the site more effectively.

During our testing, we learned that the success of a link depends on:

- How well the user can predict where the link will lead.
- How well the user can differentiate one link from other, nearby links.

We also learned that link layout and where links lead can affect user success.
Two Extremes: A Comparison of Links

Let's start by looking at two sites that use very different approaches to links: Edmund's and Disney. Edmund's did significantly better than Disney in our study, and links may have been one reason.

At one end of the spectrum, the Edmund's site uses long text links in a bulleted single-column format, as shown in Figure 3.1. Notice that the site designers even added a sentence of descriptive text when the link wasn't clear enough.

![Figure 3.1](image)
The Edmund's site has very long links in a single column. The links are almost verbose in the description of where they lead.

At the other extreme is the old Disney site, shown in Figure 3.2. This site uses much shorter links in a three-column format. There is little or no additional description about what the links are.
Descriptiveness Aids Prediction

Links on the Edmund's site worked well. Most of the Edmund's links explicitly describe the content of the page they lead to (e.g., “How to Read the Pricing and Rating Listings”). If the link itself doesn’t contain this information, it’s often followed by a short descriptive blurb. As one user said, “I know what I’m going to get.” Users could confidently predict where the link would lead.

Link descriptions also helped users on the Fidelity site. The links shown in Figure 3.3 are actually GIF images, and the descriptions are just plain text. As this page loaded, the descriptions appeared first. Users sometimes made their
decision and clicked on the text (which wasn’t a link) before the GIF links even appeared, so clearly the additional information helped them decide.

In contrast, most of the Disney links provide little information about the content of the page they lead to. If you click on Disneyland, does this bring up a map of the park? Ticket information? Special tour packages? All of the above? The “Disneyland” link text isn’t so much a description of the content as an organization of it. The user must guess where this link leads. (The link actually goes to a Disneyland subsite containing all of the above information and more.)

We saw a similar problem with the C|net site. Some of its links (such as Product finder, BUYDIRECT.COM, and SOFTWARE.COM) do not differentiate their content well.
Many users picked the wrong one the first time, and several users picked wrong links more than once.

When people are searching for information, they pick links based on their expectation of the page the link will take them. In the Inc. site, we asked users to find the phone number of the local Chamber of Commerce. Look at the screen in Figure 3.4. Which link would you choose?

![Figure 3.4](image)

In the Inc. site, we asked users to find the phone number of the local Chamber of Commerce. Most users looked in Inc. BUSINESS RESOURCES, but the answer was in databases.

About 90% of the time, our users picked the Inc. BUSINESS RESOURCES link, because it most closely matches the content they’re looking for. The answer is actually found
under databases. "Databases" is just a catch-all term; the link by itself doesn't adequately describe the content.

Consider also the Travelocity Registration screen shown in Figure 3.5. Users who had never visited the site before didn't know what to do. The Be Our Guest link takes users to a screen where they can create a login name and password. But the "Be Our Guest" wording doesn't adequately describe the content.

**Figure 3.5**

Users didn't know that the Be Our Guest link would take them to a page where they could create a username and password.

**Be Our Guest**

You'll have full access to travel reservations and information but without the added value of a preference profile. Create a simple Login Name and Password, then be on your way!

Note that the terse Create link embedded in the paragraph didn't work very well either; more on embedded links later.

**Ambiguous Terms in Links**

Sometimes, terms that have a specific meaning to the interface designer may not have that same meaning for users. This isn't just an issue for web pages; it crops up in virtually all software interfaces. In our testing, we saw a few instances when ambiguous terminology in links led users seriously astray.
On the Disney site, users tended to confuse Disneyland with Disney World — they knew they were different places, but they couldn’t remember which one was in Florida. While searching for information about Disney World (the one in Florida), half the users followed the wrong link and literally got “lost in Disneyland!” There is nothing in the interface that helps users differentiate between these similar names, and the Disneyland home page has no links to Disney World.

On the Fidelity site, we saw a problem with the terms “Global” and “International.” We asked users to research the risk of international investment opportunities, and several people clicked the Global Network link, which provides access to other Fidelity sites around the world. One user ended up looking at a prospectus written in German. Another found herself at the Fidelity Hong Kong site, where she did her best to answer the question by looking at currency exchange rates.

The most striking thing about these problems was that none of these users ever realized they were in the wrong place! They knew they hadn’t found the right answer, but they couldn’t explain where they had gone wrong.
Problems like these are hard for designers to predict, because they often have a different understanding of site terminology than users do. And because users themselves may not realize there’s a problem, the only way to discover these problems is by directly observing users.

**Dealing with Ambiguity**

The Edmund’s site has a different strategy for dealing with some of its ambiguous terms. The site is extensively cross-linked, so even if users aren’t in the right place, they can get there. For example, the New Cars page contains a link to new trucks and sport utility vehicles, in case users go the New Cars page mistakenly.

Fidelity tried to address the ambiguous terms problem by having a dictionary of terms used on the site. However, the dictionary page took so long to load that one of the two users who tried to use it simply gave up. The other user never found the definition she needed.

**“Differentness” Aids Navigation**

If users couldn’t predict which link would get them to the content they sought, they’d try to eliminate links that seem obviously wrong and pick the one that is left.

Some sites had similar links that made it harder for the user to do this. For example, the Travelocity site has three similar-sounding links: 3 Best Itineraries, Flights & Prices, and Fares, as shown in Figure 3.7. Which one would you
select to find the best available round-trip airfare from Boston to London? (The correct answer is 3 Best Itineraries.)

![Flight Paging](image)
Let us send last-minute flight information changes through your alphanumerical pager!

![3 Best Itineraries](image)
Travelocity's low fare search engine. Book your flight today for the best deal!

![Flights & Prices](image)
Choose your flights and we'll show you the price.

![Timetables](image)
Timetables for flights to everywhere.

![Fares](image)
Get a listing of fares.

The WebSaver site had similarly indistinguishable links. For example, should a user trying to learn about annuities pick **Select the WebSaver Annuity that's right for you** or **Is the WebSaver Annuity Right For Me?** Each link leads to different page.

The Hewlett Packard site shown in Figure 3.8 finished near the top of our rankings. Interestingly, users chose the correct link on the first try. Perhaps this can be attributed at least partially to how different the links are from each other.

![Welcome to HP](image)

**Figure 3.7**
Travelocity has three similar-sounding choices for finding flights.

**Figure 3.8**
Users generally started with the correct link on the Hewlett Packard site, perhaps because the links are well differentiated.
Number of Links

Our analysis found a negative correlation between number of links and success. In general, the more links on a page that led to other pages, the harder it was for users to answer our test questions.

We aren't sure how to interpret this. But imagine an artificially simple page that only has two links: the user would have a 50/50 chance of guessing the right path. The odds of guessing correctly decrease as more links are added. So it's possible that having too many links may interfere with the user's process of elimination.

But this doesn't necessarily imply that fewer links are better. The Edmund's home page has redundant links — there are three ways to get to the New Cars page, as seen in Figure 3.9. Different users chose different ones to get to the information. Redundant links seemed to work for Edmund's.

![New Car Information](image)

**Figure 3.9**
Edmund's has redundant links: two text links 1 and 2, and one image 3 that all lead to the New Cars page.

Image Links

A weak positive correlation exists between image links (such as graphics that look like buttons) and user success. However, we saw one minor problem with image links: because they don't change color after the user clicks them, there is no visual cue that they have already been traversed. Users
did use visual cues to initially identify the image links by moving the mouse across the page and watching for the cursor to change to Netscape Navigator’s pointing finger.

The lack of visual cues can interfere with the user’s process of elimination in deciding what link to choose. Consider what we saw in testing the Fidelity site: After eliminating the other links on the home page, users clicked the @82DEV button, as shown in Figure 3.10. This link led to one of Fidelity’s sister sites.

![Figure 3.10](image)

Because image links don’t change color, some users chose the @82DEV link several times, even though it was not what they wanted.

After discovering they’d gone down a rat hole, users returned to Fidelity’s home page, looked at all the links and eliminated those they thought weren’t applicable… and then clicked the @82DEV button again. Some users repeated this process more than once.

## Link Layout

All links were not created equal. We found some differences in user success based on how the links are laid out on the web page.

### Embedded Links

Putting text around links doesn’t seem to work well. We found a strong negative correlation between embedded links (those surrounded by text) and user success in finding information.
Some pages use a terse link embedded within a sentence or paragraph, such as the Create link on Travelocity's registration screen (see Figure 3.5). The Inc. site (Figure 3.4) also uses a lot of embedded links.

When links are contained within other text, it is harder for users to pick the link they want. We believe this is because users skim rather than read. When users are searching for something specific, they scan a page looking for relevant links. If they must stop, back up, and read the surrounding material to understand the context, they will go more slowly.

On the other hand, if the link itself contains or is followed by a description of its content, users can more readily eliminate those links that don’t apply. They only have to look more closely at those they haven’t eliminated.

**Wrapped Links**

Anything that causes a link to wrap across multiple lines can damage its effectiveness. Users didn’t always realize that a link wrapped across two or more lines was actually a single link. Wrapped links are more likely to occur with longer links or multiple-column formats.
Wrapped links on the Fidelity site caused one user to answer one of our questions incorrectly. We had asked how many money market funds Fidelity offers. Figure 3.12 shows how the list of three mutual funds appears to the user.

This user perceived the "Federal Municipal Money Market" wrapped link as two separate links, as evidenced by his behavior. He first clicked the "Federal Municipal" part and read the text that appeared in the frame. He then clicked the "Money Market" part (nothing on the screen changed, because he was already there) and read the text — the same text — again. He went back and forth at least half a dozen times, trying to determine if anything was different. When we asked him, he couldn’t explain why “the links didn’t seem to work.” He did not look at the URL information in Netscape Navigator’s status line. He finally concluded that Fidelity has five mutual funds.

Edmund’s clarified wrapped links by adding bullets, but one trade-off with this approach is that it requires additional space for the bullet and indenting.

**Link Destinations**

We saw some interesting issues with links that take users to another place on the same page (within-page links) and links that take users to other sites. Our observations imply that users may have a mental model that links will take them to another page within the same site.
Within-Page Links

Overall, within-page links (which take the user to another location in the same page) showed a slight positive correlation with success at finding information. However, these links sometimes cause confusion.

We saw this particularly in the Edmund’s site, which had a very long home page and several within-page links at the top. Some users began by scrolling down the page, then scrolled back to the top and clicked the New Cars link. This link took them partway down the page, where they scanned the information and often went past it into the next section. Then they went back to the top and clicked the next within-page link, which took them to the part of the page they had just left. Some users repeated this process more than once until they realized it took them to the same place they’d already been. Others used these links without difficulty.

It’s possible to avoid within-page links by making each page short. Fidelity’s pages were short (as described in Chapter 6, Readability and Page Layout) but we didn’t find any evidence that they worked any better than longer pages. Our findings suggest that within-page links did more good than harm in helping users find information.

Links to Other Sites

Users did not realize that some links took them to other sites. While searching several sites (most notably C|net), users went off to other sites for several minutes and were totally unaware that they had left the original site. They were puzzled by the disappearance of the link structure and appearance of the initial site and by their inability to get
back to the home page (many users did not use the Back button in the browser). Users who ended up another site but did not realize it found themselves in a perplexing situation.

For example, in the C|net test we asked users to find which of the top three recommended digital cameras is the least expensive. The results of the C|net Product Finder (a search tool) had links to several manufacturers' sites, as shown in Figure 3.13.

![Figure 3.13](image)

These links led to C|net's reviews of these manufacturers' sites. Within the reviews, there were links to the sites themselves. Users didn't realize that the links in the reviews caused them to leave the C|net and go to a different site. One user looked through the Polaroid site for pricing information (which Polaroid does not provide) and then gave up, concluding that it was C|net that didn't have this information (which it did, elsewhere).

**Will Experience Help?**

What about users who return to a site frequently? Over time, as they become familiar with the content, will they learn to make accurate predictions based on terse, lower-content links?
Since we studied only first-time use of these sites rather than repeated use, we don't know how true this may be. All we can say is that we saw very little evidence of learning during our tests — once users got stuck on something, it kept giving them trouble.

When it comes to learning through experience, the hurdles for web sites may be even higher than they are for conventional software due to the sheer number of sites. If a user has visited a site 50 times, but has visited 200 other sites in the same time span, is that user experienced? Does that exposure to other sites help or hurt? We don't know.