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Web Navigation: Designing the User Experience

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Focus on designing the action.
--Brenda Laurel
Computers as Theatre

If you've organized your site's content in a meaningful, logical way, you've built a solid infrastructure to support active users. You've laid down roadways through your site. Your job shouldn't stop here, though, any more than a traditional architect would consider blueprints the final step.

For a successful navigation design, it's important to consider the interface as well. The interface is the intermediary between users and content, an interpreter and guide to the complexities of a site. In the graphical environment of the Web, interface design has to do with constructing visual meaning. The happy marriage of architecture and interface--of logical structure and visual meaning--creates a cohesive user experience. This marriage is crucial to helping users get around on the Web.

Visual messages

Look at the example of a subway system. The Boston subway system has several routes that bisect the city, reaching a large part of the population. The subway's infrastructure is generally well planned, well labeled, consistent, and predictable. No small feat for the nation's oldest subway system, which (like many web sites) grew over time.

To make the subway as easy as possible to use, its designers used color to help differentiate routes. There is a Red Line, a Green Line, a Blue Line, and so on. Cars are painted in the color of their route, to help riders make connections.

Subway maps showing the various routes and their colors are prominently displayed in station stops. Walls, signs, and stairwells are also appropriately colored.

While the Boston subway system has its quirks, it's relatively easy to figure out where you need to go. Architecture (the system's logical structure) and interface (visual cues and guidance) work together to help the subway's riders make decisions and plan routes.

If the subway provided visual cues that were at odds with its architecture--for example, if Red Line trains were occasionally used to service the Green Line-- there would be confusion. Many web sites do the equivalent of running Red Line trains on the Green Line, though. These sites construct environments in which logical structure is not supported by visual cues. Instead, these two important ways of organizing information contradict each other, and there is confusion.

How can this be? Some people will tell you that a solid site architecture will stand on its own. I don't believe it can. Even in an "undesigned" site (which is hard to imagine, since virtually all sites have some level of design), there must be a relationship between visual messages and logical structure. How large are headers? Are some items indented? How are fonts and styles used? What content appears first? How we present information--unintentionally or by design--sends messages about its relationships and context.

Hierarchies can be visual

If you read the previous chapter, you may have a growing sense of the importance of information hierarchies, the careful organization of information into clear, logical categories. Hierarchies can also be visual.

Visual hierarchies show relationships between elements on a page. This is done by paying attention to factors such as:

- The relative size of elements on a page
- Their placement or position
- Color and contrast
- Movement

Relative size can communicate information about the importance of one item over another. Large items will generally draw attention first and will be seen as the more important elements on screen. Headers, for example, are almost always larger than text, which communicates that they have weight and importance. When these clues are not available, sorting through information can be an overwhelming experience for users.

Placement or position of elements can also communicate their relative importance or the sequence in which we are meant to digest them. In English, we're accustomed to reading and writing from left to right and from top to bottom. The way we approach the screen is the same. Items to the left and top of center tend to be noticed first, and are usually considered more important than other items. The famous left-hand navigation panel took off partially because of its natural, comfortable location. Grouping or placing elements in proximity also provides information about their logical relationships.

Color and contrast also show relationships between items, establish importance, and most importantly draw attention. A highlight color on a page, such as yellow or red, draws the eye because of its difference from the other elements. A high-contrast black element used on a light-colored page has a similar effect. Color is also an excellent way to show a continuing path, since we can interpret color information rapidly and with a high degree of precision (yellow brick roads are as useful in life as in film). Using the full rainbow of colors without meaning or association--a common occurence on the Web--makes for poor visual hierarchies.

Movement draws our attention, an unfortunate instinctive reaction for anyone faced with a page full of eye-popping animated ads. If everything on screen is vying for attention in a Las Vegas-style glitter of color and lights, it becomes difficult to make decisions about information paths or judge relationships among content elements. Used judiciously and with purpose, animation can be an exciting and effective way to communicate information.

Rather than being seen as a solution to some of the Web's usability problems, graphic design is often regarded as their source. While they are central figures in print communication, designers are not yet playing a serious role in this medium.

Clement Mok of Studio Archetype explains, "We're playing catch-up. Generally, designers are not driving the agenda. The agenda is driven, nine times out of ten, by the tool makers and the manufacturers, but designers can play a very significant role in determining how layout and design can provide a new language and structure on the Web.

"This role is slow in coming," he says, jokingly adding that, "when you come in with Photoshop files and say, `This is the new way of dealing with this problem,' engineers and developers look at designers as fuddy duddies. As much as we believe it's true, there has not been a precedent set that we are credible in this category. Unless we prove that, it's still going to be questioned."

Nathan Shedroff: "It's about what people can do"

Nathan Shedroff, vivid studios' Creative Director, has written a great deal about interaction and information design for the Web, and has plenty of insight into the process behind the results.

"When we start any project," Nathan explains, "we begin by asking our clients what their goals are for the site, which will determine how the site's success will be measured. We also ask who their audience is, and what their messages are to that audience. This is where everything important happens. The answers to these questions affect every other question down the road."

Early on, vivid looks at the amount and type of content a client has and experiments with organizing and presenting it in different ways. "We try to bring fresh eyes to their materials, and approach it as their audience would rather than from the perspective of how the company itself views or values the content--and certainly not how the company is organized internally. Most clients tend to approach their information from their own inside perspective because that's what they deal with every day. It's hard for them to see

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anything new."

Nathan points out that most companies are still approaching the Web with the idea that they can post a lot of marketing materials and be done with it. He says this approach results in "Phase 1 sites," and adds that "most companies find out that while there is some value to this, they need to think about other concerns, especially branding, identity, and navigation. So they redo their sites (Phase 2 sites). They find out that while the site may look better, be more appropriate to their company, and be easier to navigate, it doesn't do much more for them and certainly wasn't the hotbed of activity they once thought.

"So they go off in search of more," Nathan continues. "If they figure out that branding is really about experience rather than identity, then they are often led to the idea of interactivity being an enhancement for their products, services, support, and so on (Phase 3 sites). If not, they usually get duped into believing that cool new technologies are the answer and add lots of VRML, JavaScript, and Shockwave online tchotchkes that cost a lot and do even less for them."

Because the word "interactive" has become a buzzword, confusion is understandable. "Every client is different," Nathan explains, "but we need to teach clients about what `interactivity' is most often. They usually think it has something to do with Shockwave or Java."

Offering words of wisdom for new web developers, Nathan stresses that "Web developers need to understand `interactivity' just as much as clients. Interactivity isn't about non-linear navigation or moving animations on the screen. It's about what people can do on the site, what they can participate in, what the site does to address their needs, interests, goals, and abilities."

"Developers also need to learn to build what their clients need instead of what they want to build because they think it's `cool' or fun for them. Too many sites don't reflect what a company's business is all about. They're out of character for the company. This is often a fault of the client too, but it's up to us to inform our clients of the potential mistakes they may be making. That's the value and responsibility we bring to the relationship."

Nathan provides diagrams, writings, and other information on his personal site at www.nathan.com/thoughts/.

Nathan Shedroff, vivid studios

Good communication design has little to do with decoration, though it can be a thing of beauty. It's as important to a site's success as quality content, architecture planning, technical wizardry, and usability testing. When these areas come together, each presenting solutions in a unified way, each understanding the strengths of the others, the result is a well-crafted user experience

Meaning through metaphor

If you read much writing on design, you'll soon discover that there are many approaches to communication design. Visual hierarchies are the basic building blocks, but there are other tools available for our use. Metaphor is one of the most powerful--and most misused--of these.

In the literary world, authors use metaphor to explain a concept by associating it in the reader's mind with another, more familiar concept. For example, *traffic slowed to a crawl* explains that traffic was moving very slowly. The cars weren't actually crawling, but they may as well have been.

If you use a familiar device to help guide shoppers (such as FAO Schwarz's shopping bag, a clever device for the storage of purchases), you're using metaphor. If you use the image of a highway to explain the Internet (the "information superhighway" of Al Gore's famous speech), you're using metaphor.

Take the example of PhotoDisc (www.photodisc.com), a well-known source of digital stock photography. In their search engine, an excellent feature allows artists to collect possible images for a project and keep them in a "lightbox" to look at later, as shown in Figure 5-1. You can name your lightbox and send your colleagues there later to look over your selections. You can even leave notes about images, or read notes left by colleagues. It's an amazingly helpful feature.

Figure 5-1. Photodisc's "lightboxes" work well as a metaphor, conjuring up images of designers clustered around a traditional device of that name.
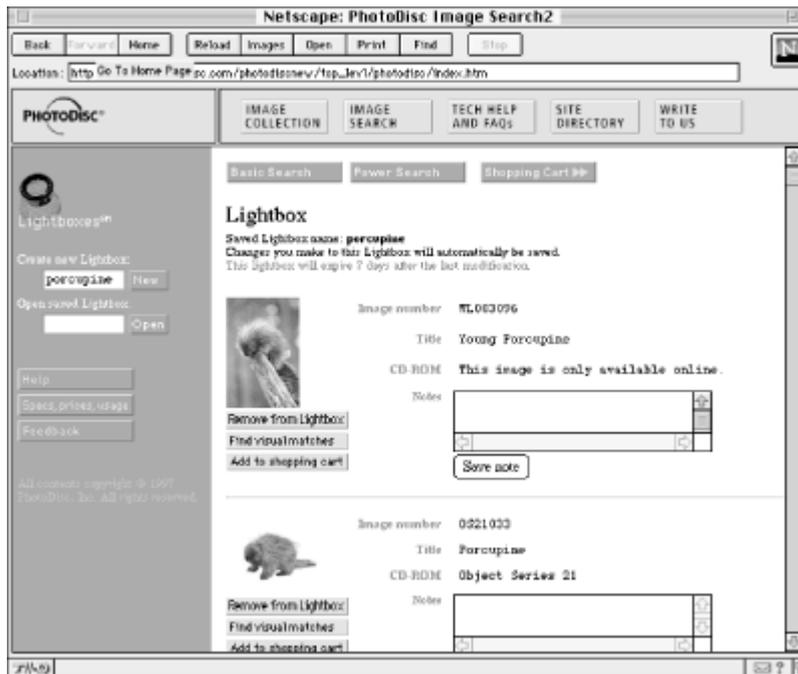
In planning this new feature, Photodisc had to give some thought to how designers would relate to it. How could it be explained to this audience in the best possible way? They could have gone with a literal explanation, such as, "We'll be using cookies to maintain state for seven days," or even, "We'll store your user profile and relevant thumbnail images in a database and allow multiple users to access it." Snooze.

The metaphor of a lightbox conjures up images of designers clustered around one of the "old-fashioned" devices of that name, viewing and selecting slides for a project. This communal decision-making process is what PhotoDisc's lightboxes are all about, and this is how it was best explained. By choosing the concept of lightboxes to help explain this new digital tool, PhotoDisc associated a potentially scary technology (cookies, or a database) with a familiar and comfortable design process. It's a metaphor that's as effective as the product itself.

Metaphor can be as restrictive as it is helpful, however. Selecting the wrong metaphor for a concept, failing to carry it through, or even taking it too far can result in awkwardness or confusion (not to mention "cute-ification").

For example, Yahoo-style lists of subject categories are often called "channels." This began around the time that so-called push media exploded on the scene, but these channels have nothing to do with broadcasting. They don't relate to TV either. They're misleading and misnamed, and despite having useful content, are likely to be overlooked by some visitors.

Show and tell

News flash: readability is coming back into vogue. Even understanding the current controversy over design approaches, this strikes me as unbelievably bizarre. It's a bit topsy-turvy that we work in a communication-oriented field that perversely considers the clarity of written communication to be optional.

How has this happened? Design is a broad and varied field, encompassing aspects of art, business, and psychology. Because of its frequent association with sales, design has had a longstanding affair with getting attention. But lately, it seems this has led to an interest in pure shock value: bright colors, chaotic layouts, hostile typography, convention turned on its head.

Much of this has been done in the name of innovation. That's a shame, since it's a fallacy that innovation means breaking all the rules. Sometimes it means understanding them better than anyone else--getting at the core of why rules exist, and extracting nuggets of truth about communication that have never been explored before.

Clarity versus chaos

On the Web, it can be especially troublesome to play with chaos in design. For many users, the Web already represents chaos. Adding a veneer of confusion is sometimes the last straw. If scripts and animation are battling for attention, adding unreadable type and bad color contrast is probably not going to help.

What's fun and different in an MTV video or cutting-edge print magazine does not automatically translate well to the Web. If you're designing a band site or a grungy e-zine, you'll certainly have more flexibility than if you're designing a medical information site, since purpose and audience will affect the approach. But even MTV buffs deserve a structured layout. Even the nattiest hipster deserves readable text in an e-zine. Without these basic design values, you're creating art (which is about individual expression), not practicing design (which is fundamentally about communication). It's a crucial difference-- especially to your users, and especially on the Web.

Things have gotten so out of hand that it's become a bit of a joke in the field (one that would be funnier if there weren't still a raging controversy over it). One site, jodi.org, uses a deliberately chaotic interface to satirize the current trend. It's purposefully confusing and makes no claims to guidance or instruction. Essentially, it's the Web's first real piece of performance art, letting visitors experience what chaos in interface design feels like.

In navigation design, it's cruel and unusual punishment to offer chaos instead of guidance, self-expression instead of shared communication. Interface design, like many areas of design, is service-oriented--it's in service to the message, the client, the users, and the medium. That makes the work of an interface designer a serious challenge, since it is much harder to understand others' needs than it is to know your own tastes. There may not always be glory in it, but service is the hallmark of good design.

Visual explanations

Could better design have prevented the space shuttle Challenger's disastrous explosion? Edward Tufte thinks so, and he's not even talking about the shuttle's design.

In *Visual Explanations* (Graphics, 1997), Tufte explains that shuttle engineers knew the night before the launch that there was the possibility for disaster. A critical part, a seal called an O-ring, was not expected to work correctly in the extreme cold forecast for the morning of the launch. The engineers put

together multiple charts to explain the danger, none of which convinced the decision-makers to halt the launch. The shuttle was launched the next morning in 29-degree cold. Less than two minutes after launch, it burst into flames.

What went wrong? The direct cause was that the O-rings were not designed to withstand extreme cold. But Tufte shows a more tragic design flaw: the sadly unpersuasive charts used to explain the O-ring problem.

Tufte argues that the charts failed to display the data causally, or in a way that would clearly show cause and effect. It was clear to the engineers that low temperature caused O-ring damage. They simply failed to *show* that it did.

Navigating the Web could hardly be called a matter of life and death (though cases of fatal misinformation exist). But if misinterpreting information could cause a group of intelligent people to proceed with a doomed launch, imagine how it could confuse and mislead web users! We should be as concerned with how we show connections within a site as Tufte is with showing relationships within data. Visual displays, whether charts, books, or interfaces, have the power to be expository--a power far beyond decoration.

Form is function

Periodically on mailing lists and at conferences, a small brush fire is ignited when someone brings up the old debate over "form follows function." This debate is based on a common misunderstanding, one that becomes clear if we look at the work of Tufte and other great designers. "Form follows function" has been widely misinterpreted to mean form versus function, a battle of opposing forces, and so designers and technologists seem doomed to duke it out.

But form and function, as the architect Louis Sullivan meant when he originally coined the phrase, go hand in hand. In Sullivan's view, "The architect who combines in his being the powers of vision, of imagination, of intellect, of sympathy with human need and the power to interpret them in a language vernacular and true--is he who shall create poems in stone."

Good architects tend to understand what this is all about, and some of our finest public buildings and corporate workspaces are the tangible results. Information architects understand that this same concept can be applied to information spaces. Design is not a battle between form and function, emotion and reason, decoration and purpose. In your users' eyes, these elements are intertwined, for better or for worse.

The psychology of design

It's virtually impossible to separate the design process from end users, readers, or visitors. They're the reason we bother with visual messages in the first place. Without these users, you may as well be broadcasting into deep space. Understanding human quirks is as much a part of a designer's toolbox as high-end graphics software or a good set of drawing tools. If anything, it's more important.

On the Web, where we're shaping new and sometimes experimental

interactive spaces, these issues are thrown into high relief. It's essential that we try to understand how people are likely to react to problems, why they sometimes fear the screen, and how they learn new things. Without understanding some of these areas, predicting the active process of navigation becomes little more than guesswork. Without understanding some of these areas, we'll never get past our reputation as an unfriendly and butt-ugly medium.

Designing for action

If you accept that a web site is a space, then it's natural to assume that there are objects in it--things we can pick up, manipulate, press, or otherwise interact with. There may be control panels with buttons to press, or drop-down menus to scroll through, or objects that change when you roll your mouse over them. All of this may end up sounding a lot like building a transistor radio-- and in a way, it is.

There are lessons from industrial design that we can borrow for use in web design, many of which are based on solid cognitive science. They help explain how we think, react, interpret, and learn. They explain why we sometimes push handles that are meant to be pulled, and why a large segment of the population doesn't have a clue how to program a VCR.

The psychologist we have to thank for most of this research and writing on user-centered industrial design is Donald Norman. Norman's most famous book, *The Design of Everyday Things*, sheds some light on how design can be brought more into line with human needs. It's an appealing thought--a world in which we don't struggle to understand objects; instead, they are designed to "understand" us.

Norman's survey of poorly designed objects can be damn funny. He tells stories of people walking into glass doors, rigging up cabinets with string, and standing helpless before bathroom faucets whose use was a mystery. Other stories--of "human error" at a nuclear power plant or "pilot error" related to a crash--are less humorous, and make the importance of human-centered design very clear.

In studying how people use tools and complete processes, one of the things Norman looked at was actions. He highlighted seven stages of completing a task:

1. Forming the goal
2. Forming the intention
3. Specifying an action
4. Executing the action
5. Perceiving the state of the world
6. Interpreting the state of the world
7. Evaluating the outcome

In order to support each stage of this process, Norman suggested using these seven stages of action to ask design questions, described in Table 5-1.

Table 5-1 Seven stages of action and relevant design questions for each

Seven stages of action	Relevant design questions
Forming the goal	How easily can one determine the function of the device?
Forming the intention	How easily can one tell what actions are possible?
Specifying an action	How easily can one determine mapping from intention to physical movement?
Executing the action	How easily can one perform the action?
Perceiving the state of the world	How easily can one tell if the system is in desired state?
Interpreting the state of the world	How easily can one determine mapping from system state to interpretation?
Evaluating the outcome	How easily can one tell what state the system is in?
Source: *The Design of Everyday Things* (Doubleday, 1990)	

These specific design questions can be boiled down into broader principles, based on cognitive processes. These are Norman's "principles of good design":

- ✍ *Visibility*. By looking, the user can tell the state of the device and the alternatives for action.
- ✍ *A good conceptual model*. The designer provides a good conceptual model for the user, with consistency in the presentation of operations and results and coherent, consistent system image.
- ✍ *Good mappings*. It is possible to determine the relationships between actions and results, between the controls and their effects, and between the system state and what is visible.
- ✍ *Feedback.* The user receives full and continuous feedback about the results of actions.

Paying attention to these user-centered design principles--visibility, conceptual models, mapping, and feedback--is not just for designing phones and transistor radios. Think of how many times you've clicked on something believing it to be a link, or gone to a page that offered no feedback about location. These are important design principles, whether it's industrial design or navigation design. Keeping them in mind could save your users a lot of trouble since, as Norman puts it, "If an error is possible, someone will make it."

Designing for interaction

We talk a lot about "interactive media," but what does this really mean? Interactivity has become a bit of a buzzword. Is it synonymous with "responsive technical feature" or is it synonymous with "good conversation?" I'd argue that it's more of the second, though it can also be the first, when things have been done well.

Interaction, in a nutshell, is two or more people having an exchange--of ideas, of emotions, of physical objects, of words. On the computer, interaction is still two or more people having an exchange, with the exception that the

interaction is mediated by technology. Interactions on the computer are often as complex as interactions off the computer, and it's helpful to understand both.

For example, what makes an interaction positive instead of negative? Politeness is one essential ingredient of a positive interaction. We know this is true in daily life, but surprisingly, it seems to be true in computing situations as well. In *The Media Equation: How People Treat Computers, Television, and New Media Like Real People and Places* (Columbia University Press, 1996), Byron Reeves and Clifford Nass present some interesting findings about people and technology.

It turns out that, if Reeves and Nass are right, we had all better brush up on our Emily Post. Netiquette doesn't begin to cover what we'll need to know. Reeves and Nass found that "individuals' interactions with computers, television, and new media are fundamentally social and natural, just like interactions in real life." One of the more interesting things they found is that, odd as it sounds, we are actually polite to computers (or in computing situations).

From these findings, Reeves and Nass extrapolated that, on the principle that reciprocity often drives interactions, we expect computers to return the favor. We expect that they will be as polite to us as we are to them. As the authors explain it:

When media violate social norms, such as by being impolite, the media are not viewed as technologically deficient, a problem to be resolved with a better central processing unit. Rather, when a technology (or a person) violates a politeness rule, the violation is viewed as social incompetence and it is offensive. This is why we think that the most important implication of the politeness studies is that media themselves need to be polite. It's not just a matter of being nice; it's a matter of social survival.

How are we supposed to create "polite" computers? It's an interesting question. The authors of *The Media Equation* suggest starting with Grice's Maxims, a set of politeness principles (mainly for conversation) that were set down by philosopher and psychologist H. Paul Grice. According to Grice, these principles are:

- Quality (saying true things)
- Quantity (saying neither too much nor too little)
- Relevance (saying things that relate to the topic at hand)
- Clarity (saying things clearly and well)

Quality. Quantity. Relevance. Clarity. These politeness maxims sound an awful lot like what we're striving for in web design these days. They may be less tangible than "responsive technical components," but they're probably more essential to understanding what people want from our mediated interactive spaces.

Recap

Our understanding of the interface and how to design for it is constantly evolving, but there are some things we have already discovered. The

importance of social interactions in our dealings with computers is increasingly clear. The concept of continuity in space is also becoming more accepted in computer-based design. Design principles such as visual hierarchies and metaphor remain an important part of how we process information, on screen or off. These elements help sculpt environments for real humans, based on social morés and messages. While trends in interface design may change (for the better or for the worse), there is one design principle that hopefully will not: what we do for the screen is for and about people. They must drive our efforts.

Find out more

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User Experience Design (UXD or UX) in web design is the process of enhancing user satisfaction by improving the usability, accessibility, and efficiency of user. Here at Intechnic, we've been studying and applying the best user experience principles in our work. Earlier this year I became the 9th person in the world to earn the prestigious Master of UX Certification from Nielsen Norman Group – the world's authority on UX design. I would like to share some of the best practices I've acquired over the years (including Top UX Statistics). 68. Instead of carousel navigation arrows, use descriptive labels so users know what to expect on the next slide. 69. Only about 1% of users click on carousel slides on websites so don't rely on those clicks. Responsive web design (RWD) is a web development approach that creates dynamic changes to the appearance of a website, depending on the screen size and orientation of the device being used to view it. RWD is one approach to the problem of designing for the multitude of devices available to customers, ranging from tiny phones to huge desktop monitors. RWD uses so-called breakpoints to determine how the layout of a site will appear: one design is used above a breakpoint and another design is applied below that breakpoint. To truly assess the user experience of a responsive design, do not test your responsive designs only in the comfort of your own office, on your high-speed connection.