Gershom Rides Again

Guidelines for creating web sites intended for use by human beings.

by
Gary J. Dickelman

It's late. I've been surfin' the Web for hours and I'm not feeling productive. I am thinking of the wild west - not because my mind is wandering, but because of the sites I've found. They remind me of cowboys and horses. I imagine riding out to the range on my trusty steed, in a weather-worn hat and with whip in hand. *Whip - Snap*!** *I settle into the rhythm of hooves punctuated by a familiar bass line: Dum-di-di dum-di-di dum-di-di dum-di-di .... It's the Rawhide theme. (If you're under 40, ask someone older to sing it, or rent The Blues Brothers and watch the 'Good Ol' Boys' scene). Ready?*

"Scrollin' scrollin' scrollin' -
See the text un-foldin' -
Scrollin' scrollin' scrollin' -
ROW - HIDEEEEEEE (...please....)
There's so much, I can't read it -
I wish I could delete it!-
Row-on-row unscrolls before my eyeeeeesssssss ...."

Web sites have *got* to be better than what I've just experienced. I'm without context, frustrated by how much I've missed because I have neither the time nor the patience to read everything. I know it's because HTML is easy to code and the Web is hardly refereed. But the offenders are often those who had intended to create usable sites. These remarks are address to them and to the rest of us designers who occasionally fall into the same traps.

Surfers cannot help but encounter unbridled web sites. Here are some statistics on the my browser's Home site:

Number of links:	122
Scroll length:	5 pages
Number of distinct regions:	17
Number of things that flash:	8
Number of graphical links:	17
Number of words:	880

Figure 1 is a representation of the 122 first-level links (Home is at the center):

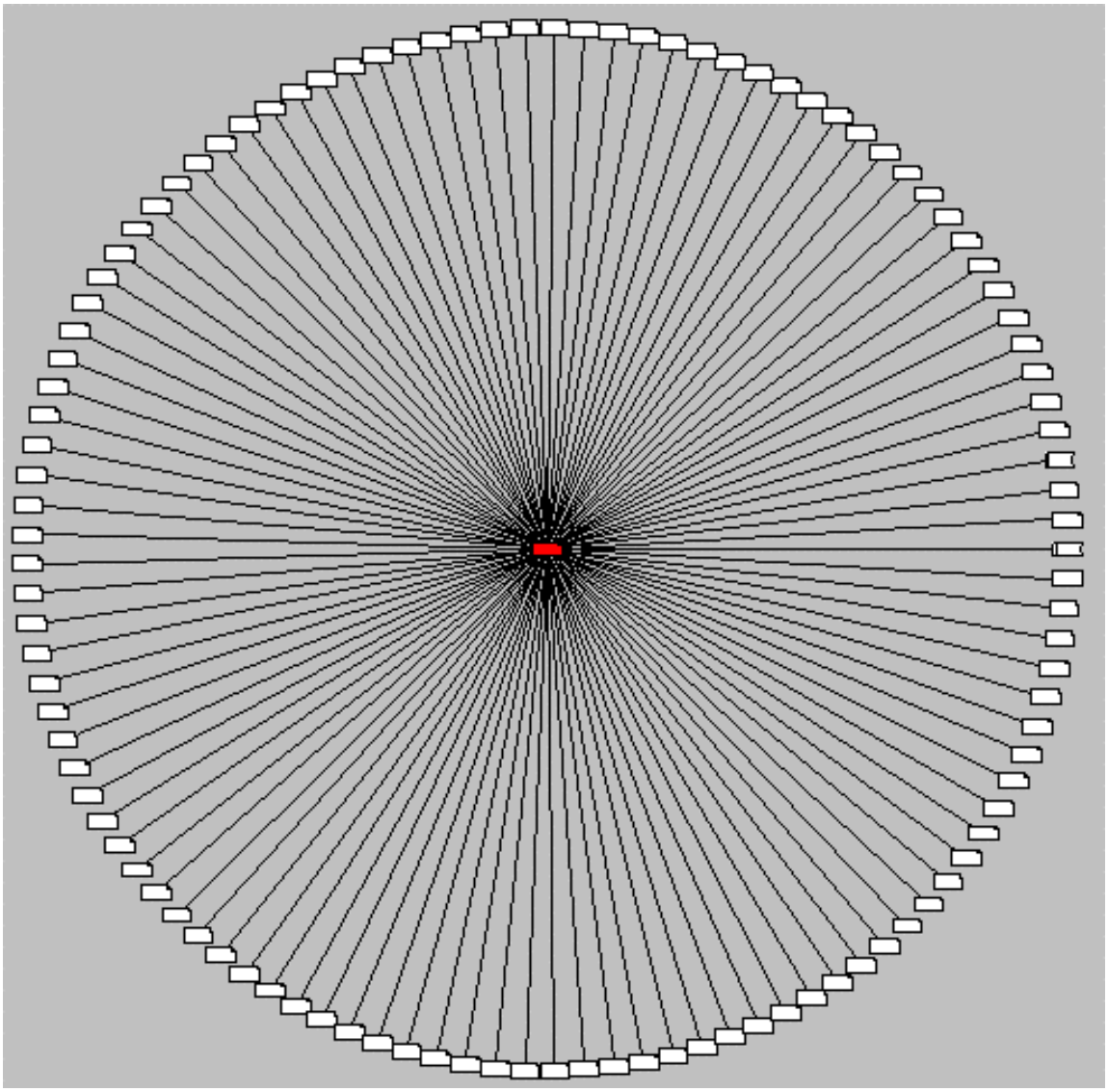

Figure 1: First-Level Links from a Home Page

Even more frightening is a picture of the first *two* levels of links:

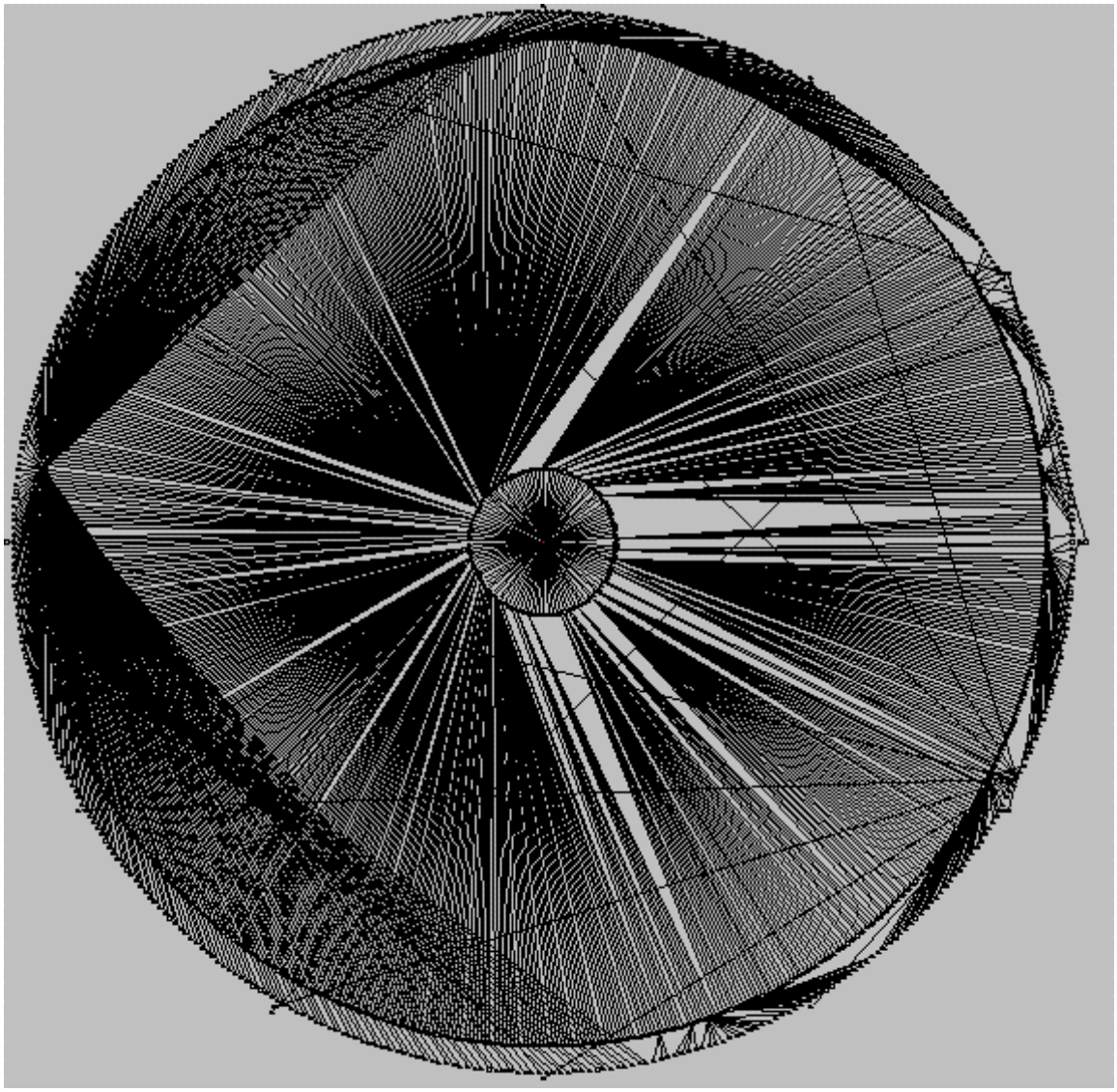

Figure 2: Two Levels of Links Associated With a Home Page

The small circle in the middle of Figure 2 is Figure 1. Shading is formed by links from one node to another. There are approximately 5,000 jumps in a scroll 1,000+ pages containing 700,000+ words. Aside from the spontaneous growth in our capacity for amazement, there are several observations we can make:

1. There are too many things to keep track of. Human beings typically keep from five to nine things in short-term memory. This site has way more.
2. It's improbable that anyone will understand the site's structure. Its 17 distinct areas cannot be seen simultaneously.
3. It is too big, too fragmented, and too busy.

4. Destination pages are equally busy, causing loss of context.
5. There are so many words and links that it is impossible to make semantic connections.

There's no law 'n' order here. It's time fer a showdown!

The Wild, Wild Web

The Wild West is a great metaphor for the World Wide Web. Folks with nothing but **H**o**TM**eta**L** at their side and a twinkle in the eye are venturing out to populate the cyber plains. A phenomenon exists whereby people who never dreamed they would be programming are now publishing web sites. *Squatters rights.* The site analyzed above was not developed by a hacker but was created by experts for a very successful corporation. It appears that having HTML skills provides designers with a very heavy hammer - and a notion that almost every word is a nail.

*Imagine yourself back in town, cautiously approaching the saloon. You swing open the doors and who do you encounter? **Card Sharks**! Just outside the saloon are the **Holy Scrollers**! You experience a moral dilemma: "Who shall I follow?" Next, the Sheriff enters the scene (...stay with me, now...it will all become clear shortly...).*

Whoooaaaaa! Back to basics

What is hypertext? In Robert J. Glushko's SALT 1990 presentation Practical Introduction to Hypertext and Hypermedia he suggested several options:

a) a right-brain artistic panacea that is a revolutionary new concept
b) 'hype' + something else
c) an evolutionary concept for increasing the accessibility and usefulness of on-line text

If you guessed *c* then follow along. Constructing a hypertext (or hypermedia, performance support system, CBT, or enterprise application) requires engineering discipline. A favorite definition of *engineering* is: a science by which the properties of matter and the sources of energy in nature *are made useful* to human beings (Webster's New Collegiate Dictionary). Even if a web site is for recreation, the author typically had a purpose and a goal in mind. Engineering, therefore, consists of meeting the goal by creating a usable site with respect to content, structure, semantic encoding, and wayfinding.

A recent Usability Report (10/21/96) entitled Navigational Issues In WayFinding On The World Wide Web (D. Bachiochi, E. Choinard, N. Conlan, D. Way of Aetna Life & Casualty, and M. Danchak of The Hartford Graduate Center) defines Wayfinding as providing human beings with the answers to four simple questions:

1. Where am I now?
2. Where do I want to go?
3. Am I on the right path?
4. Am I there yet?

The study concludes that the tools inherent to web browsers are not sufficient for effective wayfinding. They must be augmented with:

- Logical structure design
- A website home, labeled as such, on each page
- Structure buttons (Table of Contents, site Map, Index)
- Structure buttons and the website home fixed at the top beneath the browser directory buttons. Current results indicate that textual representation may be better than iconic.

Dillon, McKnight, and Richardson ([7], pp 172 - 175) explain that there are important distinctions between physical representations and semantic intentions of hypertext. It is no surprise that the Wayfinding study concludes that usable web sites must include both structural and semantic constructs.

If the content consist of material already in print, then the first design principle can be summarized by the following picture:

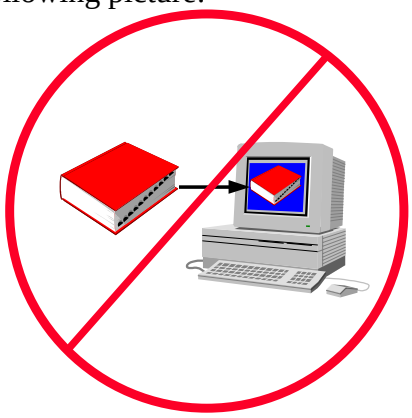

Figure 3: Design Principle #1 for Conversion

Direct conversion from text to hypertext doesn't work. Human beings do not read computer screens as they read print. What we've come to accept are standards for ink on a wood pulp derivative. Texture, density, reflection, economics, and size are but a few of the characteristics peculiar to print. Each is different for the computer screen and has a different effect on human tolerance. The density of a character is up to 100 times greater on the printed page and has an enormous effect on how long a person is willing to read continuously.

I get that sinking feeling each time I jump to a web site and find myself waiting for the page to load - not because of graphics, but because of the length of the document. Fear and loathing are symbolized by the long scroll bar; I hit STOP and move on. Developers of such pages are the *Holy Scrollers.* They develop or convert large quantities of text as single scrolling entities while missing important usability principles. The Holy Scrollers hang on to the *artifact* of scrolling - a traditional means of accessing text on a computer - but confuse it with hypertext, where restructuring, "chunking," semantic encoding, and wayfinding maps must be present if value is to be added.

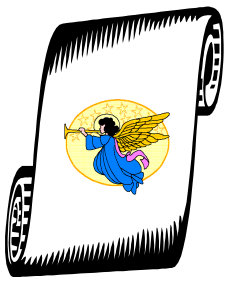

Figure 4: The Holy Scrollers

According to Nielsen ([9], p. 263):

> Traditional text is extremely heterogeneous as can be seen by comparing a mystery novel with a corporate annual report. You do not need actually to read the text to distinguish between the two. But the same two texts would have looked exactly the same if they had been presented on-line ....

<u>If it ain't broken, don't fix it.</u>

During a recent intranet design session one of the participants said, "Let's not waste time analyzing this manual to death. It has an index and a table of contents. Just use them." But direct conversion may render a document largely unusable the moment it's on the screen. If care is not taken the document may lose structure, meaning, and even content as so much is suddenly hidden.

Consider restructuring each of the following as hypertext:

<u>A Prayer for Owen Meany</u> by John Irving [4]
<u>The Dilbert Principle</u> by Scott Adams [1]
<u>The Oxford English Dictionary (OED)</u>

Value would decrease with an *Owen Meany* hypertext. Nielsen ([9], p. 287) cites that readers of general interest materials have better recall when the materials are linear than when they are structured as hypertext. Books are intended to be read linearly, people do not prefer to read on-line for very long, and the physical characteristics provide important clues that effect motivation - like how many pages remain.

<u>The Dilbert Principle</u> might better serve us in hypertext format as corporate reference material. Just imagine jumping directly to *Mandatory Self-Deprecation*, linking to *Strategies For Survival* then *Idiots*. Or go directly to any cartoon that includes Catbert, the Evil HR Director. A *Dilthaurus* might help us get through the day!

Consider the following Web site organization of how *I* think about and use The Dilbert Principle:

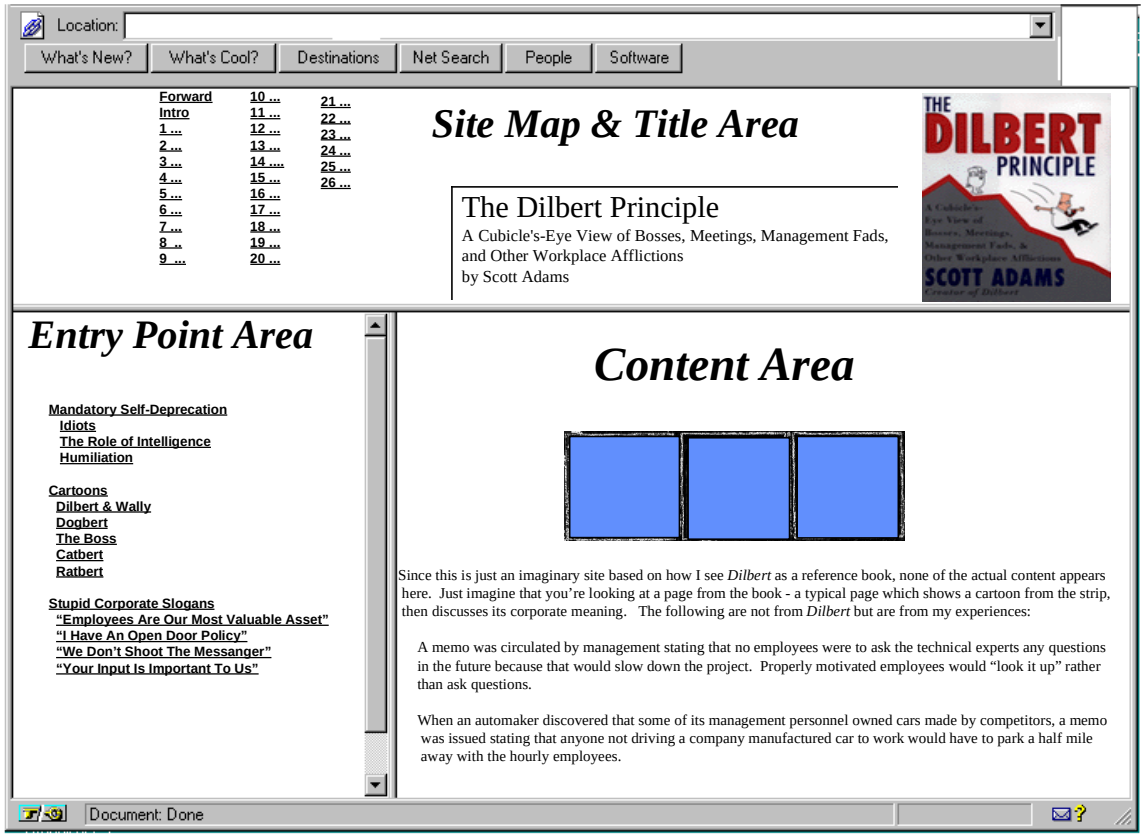

Figure 5: An Invented, Expository Web Site for The Dilbert Principle

The ***Site Map & Title Area*** is static and has no scroll bar. It contains an explicit representation of the site structure as conceived by the designer The title and picture of the book's cover do not scroll away as you navigate to any major element (chapter), thus context is not lost. This ***Site Map*** is the book's table of contents (TOC), which is how the author conceived its structure. When you click on a chapter it appears in the ***Content Area***.

The ***Entry Point Area*** is reserved for links other than those related to the explicit structure. It links to content based on how the site is used by human beings from a mostly *semantic* perspective. Entry points are determined by observing and analyzing how people use the document and make associations between its words and the larger context. The clues of usage for a printed work are usually pretty obvious: dog-eared pages, sticky notes or other papers hanging out of the book, dirty binding (because of frequent use), folded pages, highlights, scribbles, and the like. Entry Points represent *implicit* structures and *semantic* encoding of the document from the reader's point of view and typically serve 80% of users as they perform typical tasks.

Entry points can be independent of or dependent on the site Map. The choice is based on how much intra-document navigation (versus inTER-document navigation) is required and how the structural elements of the site Map must be augmented by semantic clues for the site to be usable. In the Dilbert example the entry points are independent of the site Map. We might have analyzed each chapter for implicit structure and presented a separate set of entry points for each one. The user would be presented with a different set of entry points each time a different chapter was selected from the TOC, thus forming a hierarchical browser - another useful but often abused wayfinder.

Eaaasssyyy now!!

Hierarchies must be applied with care. They should be as flat as possible and their use must not result in loss of context. In the previous example the user never loses site of the levels of hierarchy because the ***Site Map Area*** and the ***Entry Point Area*** never disappear. On the other hand, the conventional way of navigating via hierarchies goes something like this:

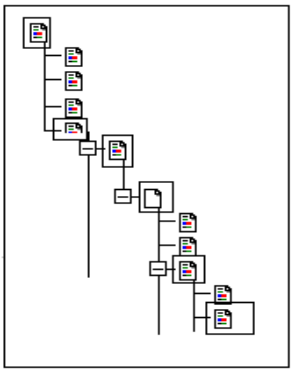

Figure 6: Typical Hierarchical Linking

The diagram represents six "hits" into a hierarchy. On the Web each linked page completely overlays the previous. Imagine each new page stacked on top of the previous. In the end you would have a stack of six pages with the item of interest hidden on the *bottom* of the pile. Curious. Most people prefer that the things they want be on *top* of the pile.

New in town, stranger?

When asked how people find their way around a printed work the answers are surprising: "I flip through the pages back-to-front until I see the weather map or the picture of such-and-such. I know it's just past the middle, on the back side of a page." They are referring to *artifacts* of the printed work - which may have value as on-line wayfinders. They define an *implicit* structure for the user. Artifacts help us to fine-tune our knowledge of the global structure to find our way in an instance. When we analyze entry points we find that they suggest the importance of being able to "see" how much stuff there is, what it's about, and where specific content lies in relation to the whole. Wayfinding, therefore, is incomplete without both site maps and entry points.

Readers must have artifacts to make inferences analogous to physical size, shape, and dimensions of the printed work. Donald Norman ([13], pp. 104, 105) notes that our information-based technological world has an inherent problem: It is invisible. "It is up to the conveyor of the information and knowledge to provide shape, substance, and

organization...[via artifacts]." Without appropriate design of artifacts in our virtual domains, Norman says, "...our tools will continue to frustrate, to confuse more than clarify, and to get in the way rather than merge with the task. The power of information artifacts is that they provide an unrivaled opportunity to enhance our lives."

Entry points may seem inconsistent compared to a site map. For example, Mandatory Self-Deprecation, Cartoons, and Stupid Corporate Slogans have nothing to do with one another. It doesn' matter because entry points are what people find useful for navigating Dilbert as a reference book (determined through analysis, such as contextual interviews). The topics are functional. Think about the dashboard of your car: Audio Controls (radio), Environmental Controls (heat and air conditioning), and State Indicators (speed, oil pressure, charge, temperature) are quite distinct but nonetheless comprise functional groupings.

Ya got 'til sundown ...

The Oxford English Dictionary (OED) was structured as hypertext according to the same principles applied to Dilbert, including structural and semantic constructs in the wayfinding schema. The user interface, however, is quite different. The OED can be found on the web at http://www.oed.com/oed.html. A description is included in Nielsen [9], pp. 330-332). Highlights:

- contains 569,000 cross references, many linking to variant forms of a word, to words with similar meaning, or to entries about prefixes or suffixes;
- there are 2.4 million quotations to illustrate the way various authors have used words (showing broader context);
- two principles of access were used to address distinct sizes of entries (e.g., 20% of the entries are smaller than 50 characters, while 5% of the entries are larger than 4,000 characters), the larger structured hierarchically according to meaning and submeaning;
- the interface allows alternative displays of entries according to the user's task (e.g., need for linguistic evolution versus definition).

According to Nielsen, "We should also note that the OED is one of the few examples where hypertext is actually more readable than paper."

Notice the flexibility in the design of the OED interface with regard to the dual metaphors for long and short entries. Some designers are adamant on the issue of scrolling and insist that only a single "screen" or node of text is appropriate. These are the *Card Sharks*. A colleague recently asserted that she didn't want any node of information to be larger than a single 640x480 screen.

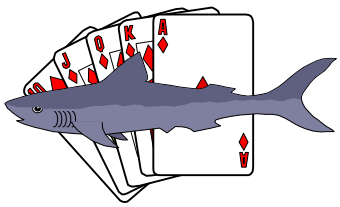

Figure 6: The Card Sharks

Neither the Card Sharks nor the Holy Scrollers should win the battle. Applying usability principles, observing human beings work, and analyzing the nature of a document will suggest whether or not nodes need to be restricted in size.

Finally, the *Sheriff* is the one who takes any or all of the above principles and insists that a hypertext must be designed in a specific way, then plays enforcer. Imagine: *The Icon Police!* Another song - "I Shot the Sheriff" comes to mind. What we've seen in the examples suggest that web design should:

- focus on usability;
- include structural and semantic elements for wayfinding;
- include artifacts that suggest how big, how much and how long;
- maintain context;
- not let important information scroll away;
- not bury what should be on top;
- leave clues, not mysteries and frustration.

Well, par'dner, ah s'pose I've stretched the Wild West metaphor about as far as you can stand it. *Spit....DING!* *So I'm a-gonna close with an appropriate thought from whence this article began. Remember my reference to the Blues Brothers? Who but Jake and Elwood could better express my feelings as I resume surfin' the web:*

Figure 7: The Blues Brothers

"It's 106 miles to Chicago. We got a full tank of gas, half a pack of cigarettes, it's dark and we're wearing sunglasses. Hit it!"

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