Communications of the Association for Information Systems

June 2000

A Taxonomy of Web Site Traversal Patterns and Structures

Mark L. Gillenson
The University of Memphis, mgillnsn@memphis.edu

Daniel L. Sherrell
The University of Memphis, dsherrll@memphis.edu

Lei-da Chen
Creighton University, lchen@creighton.edu

Follow this and additional works at: https://aisel.aisnet.org/cais

A TAXONOMY OF WEB SITE TRAVERSAL PATTERNS

AND STRUCTURES

Mark L. Gillenson
Fogelman College of Business
University of Memphis
mgillnsn@memphis.edu

Daniel L. Sherrell
Fogelman College of Business
University of Memphis

Lei-da Chen
Walker L. Cisler College of Business
Northern Michigan University

RESEARCH

A TAXONOMY OF WEB SITE TRAVERSAL PATTERNS AND STRUCTURES

Mark L. Gillenson
Fogelman College of Business
University of Memphis
mgillnsn@memphis.edu

Daniel L. Sherrell
Fogelman College of Business
University of Memphis

Lei-da Chen
Walker L. Cisler College of Business
Northern Michigan University

ABSTRACT

As electronic commerce grows rapidly and web sites proliferate, the issue of web site design becomes increasingly important. An important aspect of web site design is the set of choices for traversing from one web site page to another and the ramifications that these choices have for establishing the overall flow patterns throughout the web site. This study establishes, for the first time, a taxonomy of web site traversal patterns and structures, which will allow the organized study of the navigational aspects of web site design. It also points out the ramifications of key structures. Finally, it describes how the use of traversal patterns and structures can achieve web sites that range from loose to tight control of the end-users' experience in visiting the web site.

Keywords: Internet, taxonomy, traversal, web site design

Communications of AIS Volume 3, Article 17   2
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

I. INTRODUCTION

The growth of the World Wide Web has been a source of increasing commercial and personal interest in recent years. As opportunities open up for communication in cyberspace, estimates of the number of pages on the Web range between 275 and 320 million pages [Internet Computing, 1998]. It is not unusual to find individual web sites that consist of thousands of pages (e.g. the FedEx Corp. site is over 5,000 pages.) Clearly, the efficiency of navigation within web sites becomes more critical as web site designers attempt to design sites with particular goals in mind while also allowing the user a degree of freedom.

Among the basic tools in the development of scientific knowledge are classification schemes, taxonomic systems, and descriptive frameworks. Such techniques enable more efficient study of phenomena by providing a context for their relationship with other aspects of the environment [Sokal and Sneath, 1963]. Once a phenomenon of nature (or social activity) can be described and its variety noted in detail, study can then begin on the relationship among the variations of the phenomena, their stage of development, and predictable developmental trends. Very little such work has been done, thus far, regarding web sites. One of the innovations underlying the popularity of the World Wide Web is the application of hypertext [Nielsen, 1995], which provides some, but not much guidance, because the very nature of hypertext tends to make it much more free-form in structure than web sites.

The purpose of this research is to develop a taxonomy of common web site traversal patterns and structures. The taxonomy is based on a survey of some 300 web sites. An examination of our chosen sites provided us with a wide range of different web site navigation options and structures. However, in our study, the set of traversal patterns converged fairly rapidly. It is our hope that these proposed definitional elements will form the basis for a deeper

Communications of AIS Volume 3, Article 17   3
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

understanding of web sites and web site designer behaviors and will be added to in the future so as to provide some progress in describing the range of practices in constructing web sites. In addition to defining traversal patterns, the different types of composite web site structures are detailed.

II. RESEARCH METHOD

The research objective of this study was to assess the variety in web site traversal patterns and structures. In studies where the purpose is to collect sample data to project generalizable results to the target population, the representativeness of the sample data is of primary concern. For a study such as this one, the ability of the sample data to represent the target population faithfully is less important than the ability of the sample data to contain the entire range or variety of different behaviors or data of interest. That is, if the collected data ceases to provide new or unique instances of the behavior under study (i.e., becomes totally redundant), then the need to collect more data diminishes considerably.

The sampling procedure followed is best described as a nonprobabilistic snowball sample [Malhotra, 1996]. The determination of 300 web sites as a suitable number of sites to evaluate was partially based on a subjective assessment of a reasonable credibility level as well as the fact that beyond a point considerably below 300, we ceased finding major new traversal patterns and structures. Some of the web sites included in the study contained literally thousands of distinct pages and many more thousands of links. Indeed, most of the web sites include at least several hundred pages (as most sites of any significance do.) While our examination did not encompass a review of each and every page and linkage in each site, we believe that the identification and classification (with examples) of the distinct structures that we did find in these sites is a significant step forward as people try to advance the state of the art in

A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

we site design. The web sites used were primarily, although not entirely from the .com domain. They included all of PC Magazine's "100 Best Sites," [Kerievsky, 1998] a representative selection from the Fortune 500 companies, and others.

Table A1 in the Appendix lists the 300 web sites studied in this research. Each web site was visited during the study.

The purposes of web sites can be classified into four broad categories (Quelch and Klein, 1996; Ho, 1997):

1. *Promotion*, pertains to publicizing an organization's products and services.
2. *Provision*, refers to the supply of information for the purpose of achieving goodwill, consumer confidence and communication with customers.
3. *Processing*, which deals with online business transactions such as buying and selling.
4. *Customer service*, provides customers with rich after-sale product care and repair information as well as suggestions for future purchases.

Because the content of organizational web sites grows rapidly, many of the web sites studied contain features that allow them to be classified into more than one category. The list of the 300 web sites and their purposes indicates that the sample is a good representation of all four categories of web sites because of the substantial representation of sites falling into each of the categories. Many of these sites represent two or more of the categories.

The evaluation process for each web site visited was as follows:

1. the site was mapped graphically to display all of the internal linkages visible at the site;

Communications of AIS Volume 3, Article 17   5
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

2.   the nature of the linkages from all pages was described (both verbally and graphically); and

3.   notes were made of any as yet undiscovered, significant traversal patterns or structures in the site.

Periodically during the data collection, the authors would meet to evaluate the site maps to determine the common navigation practices, develop labels for these practices, and evaluate their relative importance. The intent of this collaboration was to develop a consensus about the appearance of the various navigational structures and mechanisms that were uncovered. In addition, this activity also provided the opportunity to assess the need for continuing to sample additional sites to uncover unique practices.

III. THE TAXONOMY

Fundamentally, a web site is modeled as a directed graph [Busacker and Saaty, 1965] in which the web pages constitute the nodes and the links or branching options between the web pages constitute the branches. (There are some minor deviations from this categorization, such as the ability to branch within a page.) Historically, a page was an HTML file. We define a *page* more generally as *a contiguous and separable body of Internet-displayable information within a web site*.

It is tempting to think of a web site as a hierarchy [Flemming, 1998; Morris and Hinrichs, 1996; Quelch and Klein, 1996], since there is always a distinct entry page which can be thought of as the "root" and the branching begins downward from there. But web sites tend to be much more complex than true hierarchies and all but the most trivial web sites quickly take on the characteristics of general networks. Nevertheless, it will be useful and clear in

Communications of AIS Volume 3, Article 17   6
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

context to use such hierarchical terms as root, parent, and child at appropriate points in the ensuing discussion.

The simplest web-page is a scrollable screen image containing text, graphics, and "hot buttons" or "hot links."

A hot button is a clickable screen icon or piece of text that serves as a branch to another page in the same or in a different web site.

Even if a page permits branching within itself, it will still be considered to constitute a single node in the web site network.

When used as a navigation device,

A "frame,", is a distinct branching construct which permits the branching choices to remain on the screen while the rest of the screen contents change.

In the frame environment, each selectable, thus branchable, set of screen contents will be considered to be a different page. Thus, for our purposes in describing web site traversal patterns and structures, the frame concept is considered as simply another branching or page-linking technique, fundamentally equivalent to hot buttons, in most respects.

Based on our web site study, we take a largely bottom-up, three-level approach to classifying web site traversal patterns and structures.

1. At the lowest structural level is the web page. It is important to note a particular page's *positional type* in the overall network, which we refer to as its *page type*, its informational or navigational purpose, which we refer to as its *page function*, and the set of page-level navigational options, in effect the set of exit options, in each page, which collectively form the links of the web site network.

2. At the middle structural level are organized groups of pages, which we shall refer to as *sub-structures*.

Communications of AIS Volume 3, Article 17   7
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

3. Finally, completing the bottom-up approach, the highest level of consideration is the overall structure of the web site.

PAGE LEVEL

To begin laying the foundation for the taxonomy, we define five web site page types: The *Splash Page*, the *Site Directory*, *Foundation Pages*, *Intermediate Pages*, and *Terminal Pages*. These five types are illustrated in Figure 1.
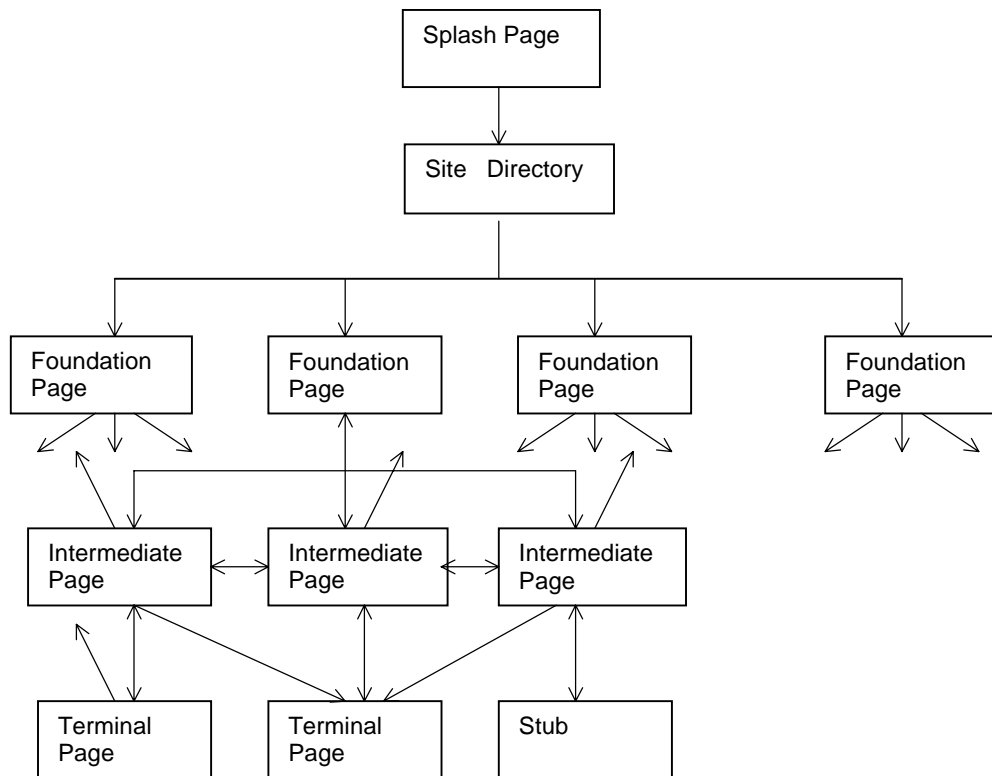

Figure 1. The Five Web-Site Page Types

Communications of AIS Volume 3, Article 17   8
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Splash Page

The Splash Page [Siegel, 1997] is, literally, the first page that a user reaches upon entering the web site. It may be simply decorative and/or informational in content, or it may serve as the Site Directory (see below). It is designed to spark the interest of the user to traverse further into the web site. Note that the term "Home Page" predates the concept of the Splash Page. The Home Page was generally thought of as the first page in a web site reached by an unmodified URL. Many people assume that the Home Page will be the Site Directory. For the many web sites that do not use a Splash Page, this definition will still be true. Of our sample of 300 web sites, ten (3.3%) have true Splash Pages. Most, like www.emersonelectric.com and www.whirlpool.com automatically move on to the Site Directory after the Splash Page appears for a few seconds. Many are animated and some, like www.mattel.com, have an audio feature. The trend seems to be moving away from the use of Splash Pages (e.g. www.ford.com used to have one but no longer does) because, we believe, people find them to be an irritating delay in trying to get their business at the site done. A variation on the theme is represented by www.phillips66.com and www.whitehouse.gov , in which the home page consists of, in effect, a Splash Page (visible when you first enter the site) from which you can then scroll down to the Site Directory, without having to traverse a link.

Site Directory

The Site Directory is a page or group of pages that form the initial and primary set of branches to the major subdivisions of the web site. The three possibilities for the Site Directory are:

1. There is no Splash Page. The Site Directory is the first (root) page of the web site.

2. A single page which immediately follows the Splash Page or is at the end of an Entry Tunnel (see below) which begins with the Splash Page.

Communications of AIS Volume 3, Article 17   9
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

3.   A multi-levelpage. Typically, in this case there is a set of branches based on either language or geographical choices that are followed by the primary, content-related branches. If the Site Directory is multi-level, then its entrance or root page is the web site's *Front Door*. For example, both www.fedex.com and www.mmm.com have a home page whose primary purpose is for the visitor to select a country or region that then takes them to what, in effect, is a localized Site Directory.

Every web site has a Site Directory. It is simply natural to enter a web site at a home page of some sort and then branch to an area of more specific interest in the site. A variation on the theme of a Site Directory is represented by www.johnsonandjohnson.com, www.oxhp.com, and www.transamerica.com, in which moving the cursor over one of the choices in the Site Directory opens a window showing one or two levels of finer choices. In effect, this variation allows a visitor to move from the Site Directory directly to a page one, two, or even three levels below it. Nevertheless, only the pages one level down from the Site Directory will be considered to be Foundation Pages.

Foundation Page

A Foundation Page is the entrance or root page of a major subdivision of the web site which is directly reachable from (is adjacent to) the Site Directory. In most web sites, the foundation pages are clearly delineated by each having a major hot button dedicated to it in the Site Directory.   Note that in some web sites, it is possible to jump from the Site Directory directly to a single page (as opposed to the window opening structure described above) that is structurally linked under a Foundation page. We shall not consider such a page to be a foundation page, but shall describe such a linkage as a *spotlight link*, later. Just as Site Directories are universal, so are the Foundation Pages to which they point.

Communications of AIS Volume 3, Article 17   10
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Intermediate Page

An Intermediate Page is a page in the "middle" of the web site (below the Foundation Page level) that contains links pointing into it and links emanating from it. Thus, an Intermediate Page can be reached from at least one other page and, in turn, can link to at least one other page. A web site's Intermediate Pages (along with its Terminal Pages) contain the bulk of the informational and transactional material that the web site has to offer. Typically, a web site includes several or many levels of Intermediate Pages.

Terminal Pages and Stubs

A Terminal Page is, intuitively, a page at the very end of a chain of web site branches, i.e. it is at the "bottom" of the web site. More formally, it is a page which may not link to a lower-level page in its own web site sub-structure, but may only link to pages that are above or parallel to it in its own sub-structure or are in a different sub-structure. If, in fact, a terminal page only links back to the page from which it was reached, then we call it a *Stub*.

Web Page Functions

A given web-page can include one or more functions designed to inform the user, accomplish movement from one page to another page in the same or another web site, or retrieve data.

- The simplest and most fundamental function is the *Informational Function* in which the page simply presents information to the user.
- The *Navigational Function* permits the user to branch to another point in the same page, to another page in the web site, or to another web site. Branching can be accomplished either with hot buttons or with frames.
- The *Search Function* can refer to either a search for specific content within the web site or a search for information external to the web site that is usually contained in one of the organization's databases.

Communications of AIS Volume 3, Article 17   11
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

- The *Transaction Function* is an interchange between a user and a web site in which information is passed in both directions with the goal of executing a commercial act, such as buying a product over the Internet.

Web Site Traversal through Links

The foundation for web site traversal patterns lies at the page level, with the options for exit or branching from each page. We explain the possibilities here, while recognizing that the "big picture" will not be discernible until we look at the substructure and web site levels, later. Furthermore, the reasons for including all of the options listed here may not be clear until then.

Taking the Site Directory as the starting point for considering the directions of the branches, the most basic type of branch is one that goes downward from a page to a page immediately "below" it in the structure. In this way, a page may link to only one page below it or to several pages below and adjacent to it. Note that a downward link (as well as links in other directions) may go directly to a point in the middle of a page, instead of to its beginning. Another case is a page that has "omni-directional" links, i.e. links that go back upwards in the same sub-structure as well as links that go downward.

A variation on this theme is a page which has omni-directional links, some of which link to pages in other sub-structures in the web site.

- A branch from one point in a page to another point in the same page is defined as an *Intra-Page Link*.
- A branch from one page to another page in the same web site is an *Inter-Page Link*.
- A branch from a page in one web site to a page in another web site is an *Inter-Site Link*.

Certain links will be of special interest as we develop the web site traversal patterns.

Communications of AIS Volume 3, Article 17   12
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

- A *Peer Link* is defined as a branch from a page to another page that has the same "parent" page.

- A *Foundation Link* is defined as a link from a page directly to one of the web site's Foundation Pages.

- A *Site Directory Link* connects to the web site's Site Directory.

- A *Spotlight Link* is a link that goes directly from the Site Directory to a page other than a Foundation Page (i.e. which "jumps over" the Foundation Page level and goes directly to a lower level page.) Most online retailers' web sites (e.g. www.bestbuy.com and www.walmart.com) use Spotlight Links to take users directly to web pages featuring certain products that will otherwise require navigating through a number of pages before reaching them.

Note that in addition to any other remarks regarding web site links, the Back Button, when active, by its nature, makes every link bi-directional.

SUB-STRUCTURE LEVEL

While web sites are not, strictly speaking, hierarchies, they do have certain quasi-hierarchical features. In regards to their overall structure, they have a single, primary entry point, much like the root of a hierarchy. Furthermore, the structure tends to branch downward from the Site Directory into recognizable sub-structures, although the many other branching possibilities quickly dispel the notion that the structure is a true hierarchy.

Foundation Structure

We define a *Foundation Structure* as a quasi-hierarchy anchored by (in which the "root" is) a Foundation Page. (In Figure 1, the second Foundation Page, together with the Intermediate and Terminal Pages linked beneath it, form a Foundation Structure.)

Communications of AIS Volume 3, Article 17   13
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

We define a *Sub-Foundation Structure* to be any of the many, smaller quasi-hierarchies within each Foundation Structure.

The nature of the Foundation Structure, because it represents a major, separable portion of the web site [Horton, Taylor, Ignacio, and Hoft, 1996; Sano, 1996], sets it apart for special consideration. It is analogous to chapters in a book or major sections in an article. Foundation Structures form the basis for the design of a web site, as the web site designer begins to conceive of the best way for the information to be presented to the audience.

Root Return Structure

Certain definable, special cases of web site quasi-hierarchies may apply to Foundation Structures or, less frequently, to Sub-Foundation Structures. A *Root-Return Structure* (Figure 2) is a Foundation Structure in which every page has a Foundation Link directly back to the Foundation Page. This permits the user, from anywhere within a major portion of the web site to start traversing anew within this same major section, from its beginning.
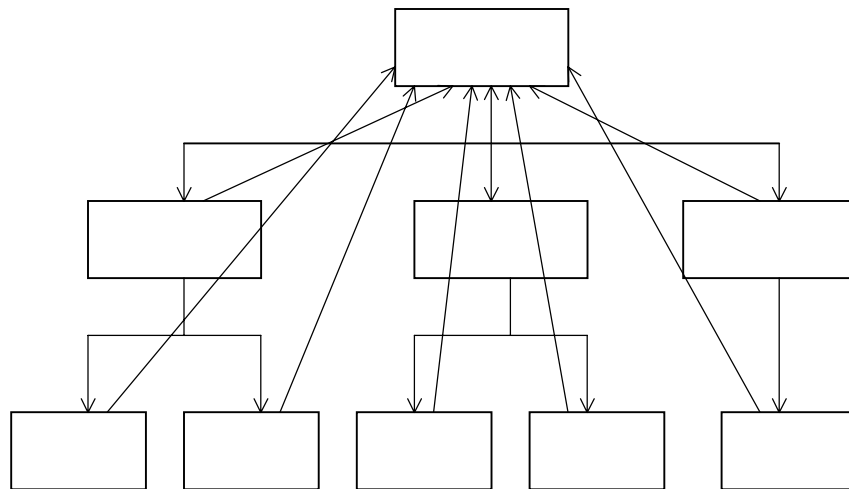
Figure2. Root Return Structure

Communications of AIS Volume 3, Article 17   14
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

A *Terminal-Only Root-Return Structure* (Figure 3) is a Foundation Structure in which only the Terminal Pages have a Foundation Link. The purpose of this structure is to force or encourage (depending on other linkage options present) the user to follow a path to its conclusion before beginning a new path through that section of the web site.

Tunnel

A *Tunnel* (Figure 4) is a linear chain of pages [Powell, 1998] that proceeds downward from the page that serves as the *Tunnel Entrance*. Each page in the tunnel has only a single entry link and a single exit link that goes to the next page in the tunnel. This structure forces the user to look at every page in the Tunnel until reaching the last page, the *Tunnel Exit*, which is either a Terminal Page or an Intermediate Page with multiple exit links. Probably the best known example of a tunnel is found in www.amazon.com in the sequence of pages that comprise the checkout process. While a visitor is looking at the descriptions of various
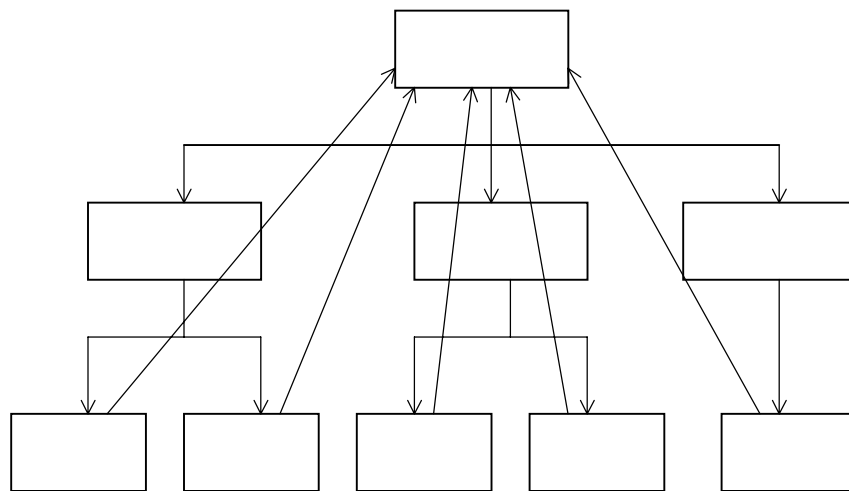
Figure 3. Terminal Only Root Return Structure

Communications of AIS Volume 3, Article 17   15
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen
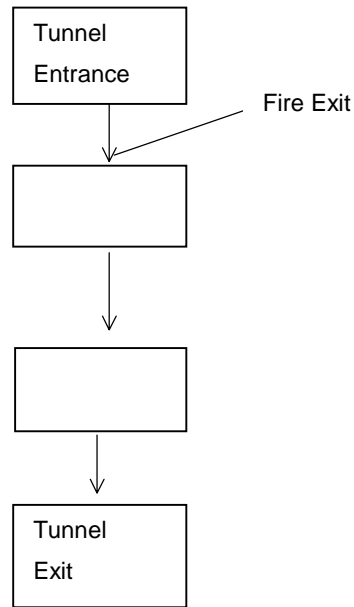
Figure 4. Tunnel

books, the site provides a great deal of freedom in jumping from one page to another. But, once the visitor commits to buying a book or books, the site is designed to lead them, one page after another, through a "checkout tunnel" that gives little or no choice and is as non-distracting as possible.

Occasionally, a page in a Tunnel will have a *Fire Exit* that is a link in a Tunnel page that allows the user to branch out of the Tunnel prior to reaching the Tunnel Exit. Tunnels may be unidirectional in nature, explicitly bi-directional with hot button links provided to go backward, or implicitly bi-directional with the use of the Back Button. One specific form or use of the Tunnel is the *Entry Tunnel* [Siegel, 1997] in which the Tunnel Entrance is the Splash Page and the Tunnel Exit is the Site Directory. Tunnels are relatively uncommon among the intermediate pages of web sites. After all, their nature is counter to the freedom of movement that is the essence of web sites. However, they do have clear uses and are more commonly found in web site entrance and exit situations.

Communications of AIS Volume 3, Article 17   16
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Channel

A *Channel* is a Peer Linked, lateral set of pages, all of which have the same "parent" page. A *Sequential Channel*, (Figure 5), is a Channel in which the pages form a simple, sequential chain. A Sequential Channel is deemed to be "open" if the pages on either end of the chain cannot be branched to directly from each other. A Sequential Chain is said to form a "closed loop" if at least one of the two end pages can branch to the other. Sequential Channels are used to display information that must be presented in a particular order. For example, online discount broker Ameritrade (www.ameritrade.com) employs a Sequential Channel to demonstrate to prospective members the online stock trading process. A *Complete Channel* is one in which every page in the Channel has a Peer Link to (can be branched from) every other page in the Channel. A Complete Channel is often accomplished with the use of a frame or, especially among the Foundation Pages, for example, with hot buttons. Both www.amazon.com and www.toyota.com are good examples of using Complete Channels for their Foundation Pages. Note that a Complete Channel is functionally equivalent to a two-level, Root-Return Structure. In both cases, the immediate "child" pages of a particular page can all be reached from each other (subject to going through the root of the sub-structure, i.e. the parent, in the latter case.) Channels are quite common in web sites of all descriptions.
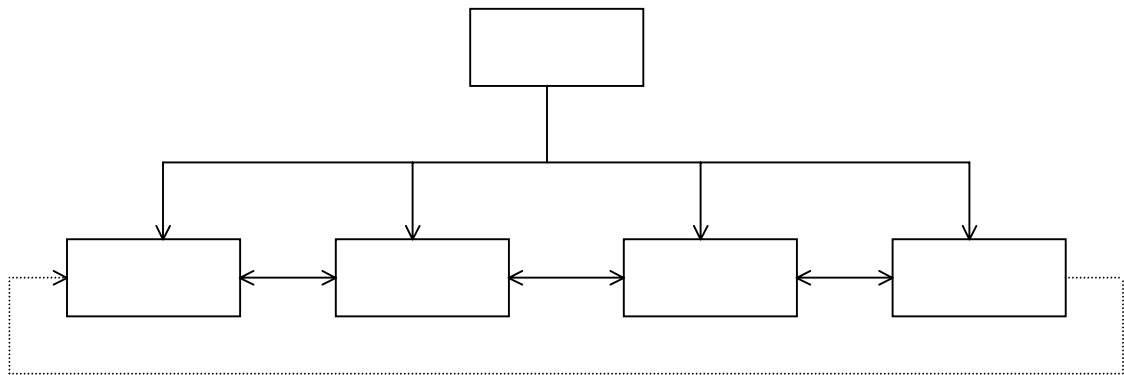
Figure 5. Sequential Channel

Communications of AIS Vol   17
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Controlled Network

A *Controlled Network* (Figure 6) is any quasi-hierarchy, a web site, a Foundation Structure, or a Sub-Foundation Structure, in which all of the pages at a given level below the "root" can branch to any of the pages at one or more higher levels below the root. For example, any page, one level below any of the Foundation Pages, may have a frame or set of hot buttons that permit branching back to any of the Foundation Pages, allowing the user to switch to another Foundation Structure. In another example, the user may branch from any fourth level page in a Foundation Structure to any second level page in the same Foundation Structure (Figure 6.) The purpose in this case is to allow the user to return to any of the primary page choices within the given Foundation Structure. Controlled Networks are especially effective in web sites for organizations which consist of multiple divisions or product lines. In the case of General Electric
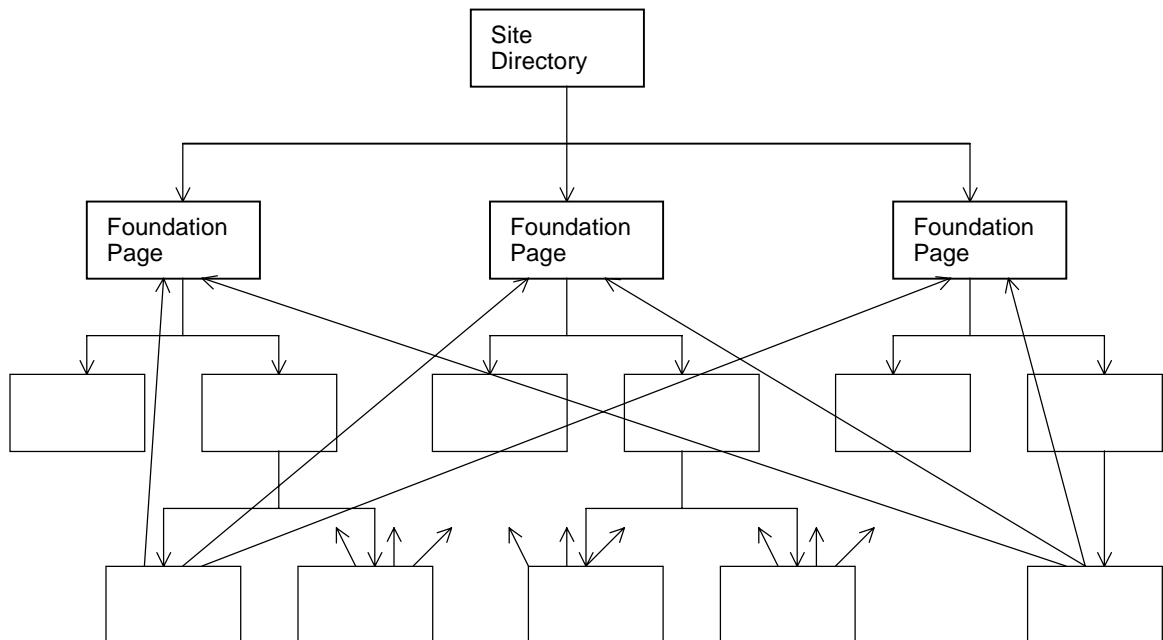
Figure 6. Controlled Network

Communications of AIS Volume 3, Article 17   18
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

(www.ge.com), users can quickly jump from one foundation structure (e.g. industry solutions) to the foundation pages of any of the foundation structures by clicking the hot buttons residing on every web page. At the extreme is a quasi-hierarchy in which the traversal options form a complete graph, i.e. every page can be branched to from every other page. This form, almost of necessity, is only practical in fairly shallow structures.

WEB SITE LEVEL

The simplest web sites, and there are such sites, are trivial directed hierarchies, which generally function as Terminal-Only Root-Return Structures, allowing return branching to the Site Directory from the "bottom" of the site. Actually, www.whitehouse.gov is a good example of such a hierarchical structure, except that an unlabeled (and therefore questionably effective) icon of the White House at the bottom of every page links back to the Site Directory. More complex web sites may be relatively shallow with the Terminal Pages no more than three or four levels from the Site Directory or they may be relatively deep, with one or more Foundation Structures having many page levels. A shallow web site permits a user to find any page with a minimum number of link traversals from the root. A deep web site allows the web site designer to develop a more complex progression of steps to the desired result. A web site may be relatively symmetric or asymmetric in structure. In the former case, the Foundation Structures are roughly comparable in size and depth. In the latter case, one or a few of the Foundation Structures are much larger and deeper than the others. In an asymmetric site, such as that of a retail sales site (e.g. www.amazon.com and www.landsend.com), the deep portion of the site can focus on the main order of business (e.g. selling the product) while the shallow parts can give general company information, company history, and so on.

A common variation at the web site level is to have either all or a subset of the Foundation Pages form a *Foundation Page Channel*. Another commonly

Communications of AIS Volume 3, Article 17   19
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

used option at the web site level is a very large scale Controlled Network (plus a Foundation Page Channel) in which every Foundation Page can be reached directly from every Intermediate and Terminal Page (for example, www.amazon.com and www.ge.com). In this case, the user has the option of branching to the beginning of any of the web site's Foundation Structures from anywhere in the site.

Finally, in addition to all of the organized sets of branches that are found, individual links can be implemented to branch from any particular page in a Foundation Structure to any other particular page in the same or a different Foundation Structure or, for that matter, to a different web-site, as needed. The use of such branches creates the most general of web site traversal options (Section IV). One example of this kind of special-purpose branch is the Spotlight Link, which allows a user to bypass the Foundation Pages and go directly to a particular Intermediate or Terminal Page from the Site Directory.

IV.   WEB SITE TRAVERSAL

When users enter a web site, the first image they see is the Splash Page (if one is present) that is designed to entice the user to continue further into the site. The Splash Page leads, possibly through an Entry Tunnel, to the Site Directory. The Site Directory, in conjunction with the Foundation Pages, allows the user to choose the major portion of the web site in which the users want to begin their visit. From there, the traversal experience becomes a combination of web site design and user choice. From a Foundation Page, users can proceed downward into that Foundation Structure. Often, the Foundation Pages form a Channel, allowing the users to decide to switch to another Foundation Structure instead of pursuing the one they are currently in. Once in an Intermediate Page, the choices may range from no choice (a Tunnel) to any of a number of choices downwards or upwards in the same Foundation Structure, to another Foundation

Communications of AIS Volume 3, Article 17   20
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Page, or even directly to an Intermediate Page in another Foundation Structure in the same web site, or to a page in another web site.

Once a user has entered a given web site, the control of traversal flow is governed by user choice based on the branching options at each page [Keating, 1997; Koreto, 1997]. But, it is the very structure of the web site combined with the decisions by the web site designers of what branching options to give the user at each page that give the designers tremendous latitude in guiding the user as they wish and if they wish, by purposefully and cleverly limiting the choices. There are really only two situations in which the user has no choice and the traversal decision is totally made by the designer. One is when there is only one branch out of an Intermediate Page, i.e. the user is in the middle of a Tunnel. The other is in the case of a Stub, where the only possibility is the return to the previous page. For example, American Airline's web site (www.aa.com) uses stubs to display privacy and security information to users when they apply for new membership online. The purpose of using such a highly restricted mechanism is to ensure that users will only be able to return to the application pages.

Consider the traversal personality of a web-site on a scale from freedom to control.

```
|———————————|———————————|
Freedom                        Control
```
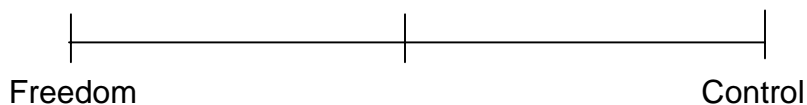
At one extreme are web-sites whose designers imbue them with a high degree of freedom (minimal control). In the middle are web sites that exhibit moderate control or moderate freedom. At the other extreme are web sites characterized by a high degree of control (minimal freedom). We refer to these three web-site traversal cases as *Loose Control*, *Moderate Control*, and *Tight Control*,

Communications of AIS Volume 3, Article 17   21
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

respectively. Of course, with structures as complex as web-sites there will, of necessity, be gradations within each of these categories and some blurring of the boundaries between them.

In the Loose Control web-site case (Figure 7), the designer's goal is to give the user a high degree of freedom to explore the web-site and even jump to other web-sites, as the user chooses. The user, as in all cases, typically begins by choosing a Foundation Structure to enter from the Site Directory. The nature of the Loose Control case begins with the user's ability to liberally branch both laterally among the pages at any given level through the use of Complete Channels and among the levels of the Foundation Structure. The inter-level movement is accomplished, in the extreme, with links constituting a complete graph in the Foundation Structure, or something less than that, as desired by the designer. These choices are implemented with the appropriate use of frames and
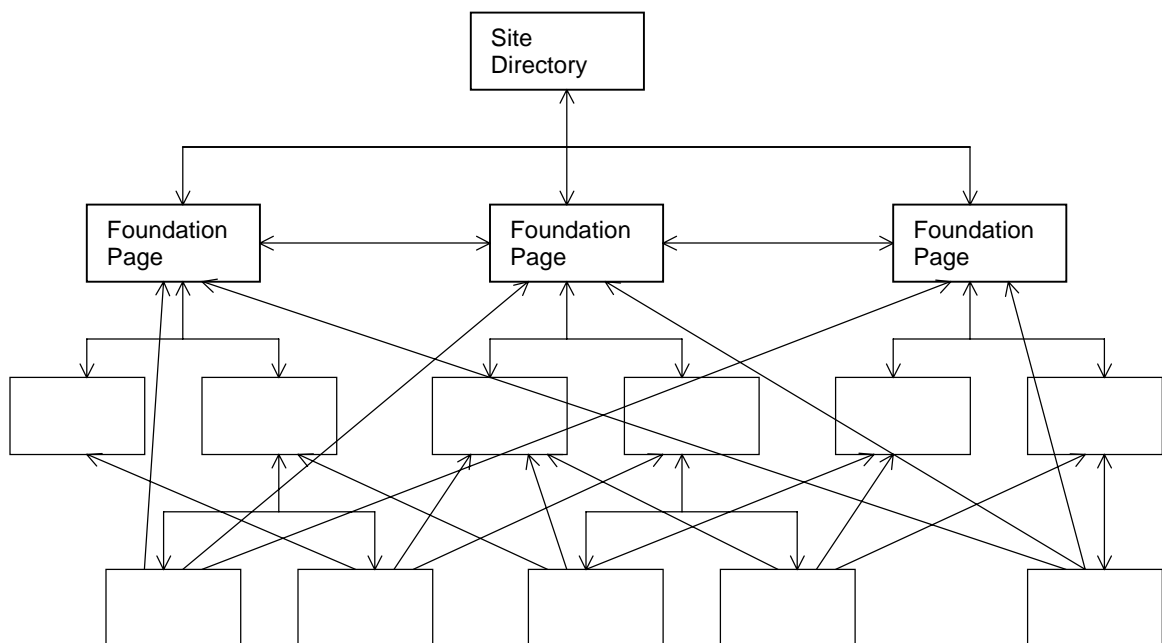
Figure 7. Loose Control Web Site

A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

hot buttons. A web site that is characterized by its loose control mechanisms is www.cisco.com. Users can easily jump to any foundation structures or substructures with a single mouse click.

The next escalation of the Loose Control case comes in the ability to jump from one Foundation Structure to another. To qualify as Loose Control, a fairly extensive network of inter-Foundation Structure links would have to be present, as a deliberately placed, limited number of such links would actually fall into a category of greater control. Finally, the extreme of Loose Control is represented by a widespread ability to leave the current web-site entirely by jumping to other web-sites.

We next consider the Tight Control case (Figure 8) so that we can compare the Moderate Control case to the two extremes. In the Tight Control case, Figure 8, the site designer's goal is to lead the user through a series of web pages of the designer's choosing. A Tight Control web-site might start with an Entry Tunnel that takes the user from the Splash Page to the Site Directory. After the user chooses a Foundation Structure, the traversal opportunities are designed to keep the user in that Foundation Structure, at least until a targeted set of pages has been navigated. Control is accomplished with a limited set of choices of egress from each page, the avoidance of controlled networks and other mass branching opportunities, and, as appropriate, the use of Tunnels and the limited use of Channels. Finally, when the user reaches the designer's desired conclusion in this Foundation Structure, the use of the Terminal-Only Root-Return Structure pattern allows the user to begin traversing another Foundation Structure in the web-site. Tight controls are often found in transaction oriented web sites in which users are taken through a series of related pages to complete transactions. For example, www.progressive.com uses a highly controlled structure when users complete information in order to obtain a quote for

Communications of AIS Volume 3, Article 17   23
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

automobile insurance. Such practice is effective in avoiding human errors and loss of data during the completion of transactions.
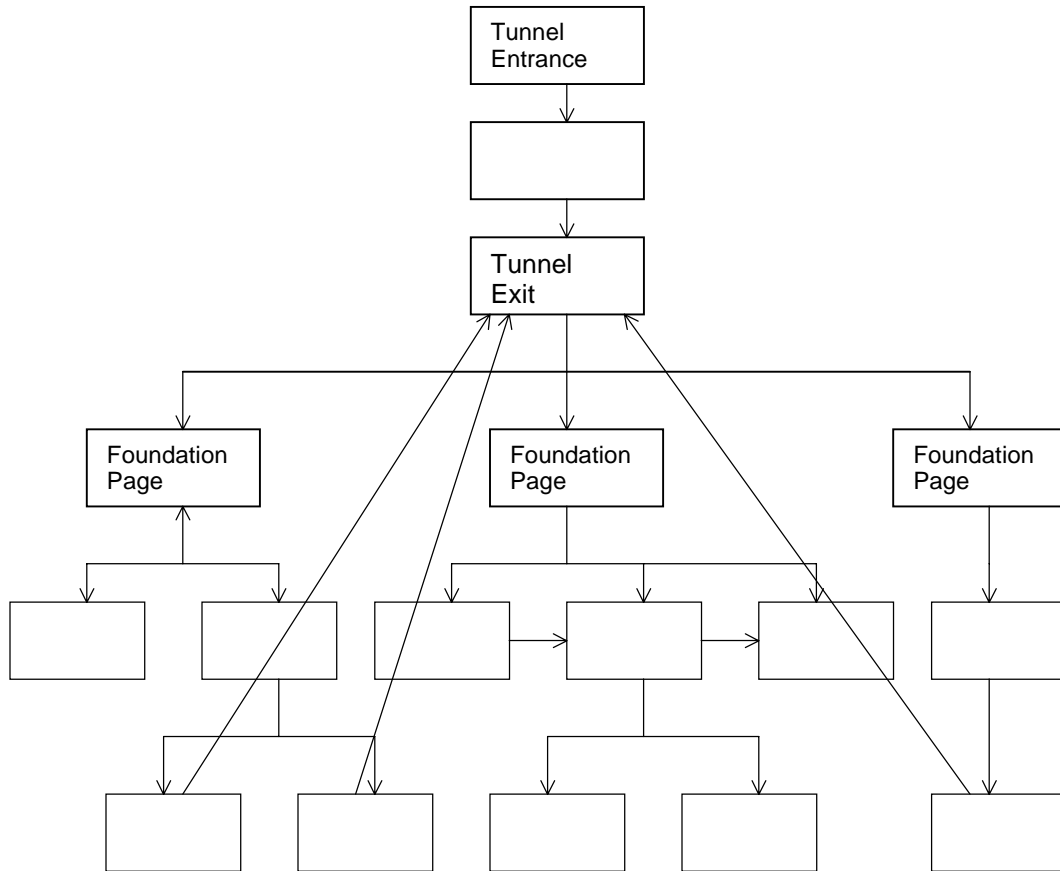
Figure 8. Tight Control Web Site

In the Moderate Control case, the site designer's goal is to encourage the users to see what the organization wants them to see while at the same time giving them the freedom to explore the site. Of necessity, the philosophy must be one of a compromise between Loose Control and Tight Control, borrowing from each where needed and adding other devices, as appropriate. For example, within a Foundation Structure, the use of a Controlled Network that targets the first level of pages under the Foundation Page allows the user to traverse a path under one of those first-level pages and then at the end of the

Communications of AIS Volume 3, Article 17   24
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

path or, more liberally, in the middle of the path, switch to another first-level page. Assuming that each first-level page begins a major section within the Foundation Structure, the user then has the ability to choose and re-choose among those sections (an exercise of user freedom) while being held within the Foundation Structure (an exercise of designer control.)

The ability to branch from one Foundation Structure to another within the site falls within the Moderate Control category when the links that the designer provides are carefully chosen and limited in number. Thus the user has the freedom to branch between Foundation Structures, but only under the controlled conditions upon which the designer decided. Also, regarding the ability to branch among Foundation Structures in the Moderate Control case, one would routinely expect to find a site-wide controlled network that targets the Foundation Pages, allowing the user to switch to a different Foundation Structure from one or more levels down in the site. Www.autoweb.com and www.dell.com are both good examples of web sites that give users a certain degree of flexibility in navigation while exerting some control over where users should go next.

V. CONCLUSIONS

The importance of electronic commerce and, in particular, the World Wide Web, has focused attention on the study of web site design. However, little work exists on categorizing and describing web site structures and sub-structures. A common body of terminology to describe the different structural options is lacking. The time has come to learn from, categorize, and assign terms to current web site designs as a way of helping to guide future design and innovation. We hope that the work in this article will serve as the basis for further study in web site categorization and design. Future avenues of approach would

Communications of AIS Volume 3, Article 17   25
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

include comparing web site designs by industry, intended audience, or function (e.g. informational vs. transactional).

Furthermore, the related issue of traversal control in web site design was not categorized previously. The nature of the Web requires designers to consider carefully how much freedom of movement to provide at different stages in the site encounter. A better understanding of the options available will make future web site designs more effective.

Editor's Note: This article was received on Febuary 19, 2000. It was with the authors for approximately three months for 1 revision. It was published on June 20, 2000

REFERENCES

EDITOR'S NOTE: The text and the following reference list contains hyperlinks to World Wide Web pages. Readers who have the ability to access the Web directly from their word processor or are reading the paper on the Web, can gain direct access to these linked references. Readers are warned, however, that
1. these links existed as of the date of publication but are not guaranteed to be working thereafter.
2. the contents of Web pages may change over time. Where version information is provided in the References, different versions may not contain the information or the conclusions referenced.
3. the authors of the Web pages, not CAIS, are responsible for the accuracy of their content.
4. the author(s) of this article, not CAIS, is (are) responsible for the accuracy of the URL and version information

Busacker, R. G., and Saaty, T. L. (1965), *Finite Graphs and Networks*. New York: McGraw-Hill.

Fleming, J. (1998), *Web Navigation*. Sebastopol, CA: O'Reilly & Associates.

Ho, J. (1997), "Evaluating the World Wide Web: A Global Study of Commercial Sites," *Journal of Computer-Mediated Communication*, (3)1. Available at http://www.usc.edu/dept/annenberg/vol3/issue1/ho.html.

Communications of AIS Volume 3, Article 17   26
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Horton, W., Taylor, L., Ignacio, A., and Hoft, N. L. (1996), *The Web Page Design Cookbook.* New York: John Wiley & Sons.

Internet Computing (1998), "Cyberstats," *Internet Computing*, June, pp. 22-28.

Keating, F. (1997), "Join the Gold Rush," *Marketing*, (17)10, pp. 26-28.

Kerievsky, T. (1998), "The Top 100 Websites," *PC Magazine*, (17)3, pp. 100-130.

Koreto, R. J. (1997), "If You Build It, Will They Come?" *Journal of Accountancy*, (184)1, pp. 84-90.

Malhotra, N. K. (1996), *Marketing Research: An Applied Orientation*, 2nd Edition.Upper Saddle River, NJ: Prentice-Hall.

Morris, M. E. S., and Hinrichs, R.J. (1996), *Web Page Design*. Upper Saddle River, NJ: Prentice-Hall.

Nielsen, J. (1995), *Multimedia and Hypertext: The Internet and Beyond.* Boston: AP Professional.

Powell, T. A. (1998), *Web Site Engineering*, Upper Saddle River, NJ: Prentice-Hall.

Quelch, J. A., and Klein, L. R. (1996), "The Internet and International Marketing," *Sloan Management Review*, (37)3, pp. 660-75.

Communications of AIS Volume 3, Article 17   27
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Sano, D. (1996), *Designing Large-Scale Web Sites*. New York: John Wiley & Sons.

Siegel, D. (1997), *Creating Killer Web Sites*, 2nd Edition. Indianapolis, IN: Hayden Books.

Sokal, R. R., and Sneath, P. H. A. (1963), *Principles of Numerical Taxonomy*. San Francisco: W. H. Freeman.

APPENDIX

Table A1. URL's Consulted

Name	URL	Purposes
3Com	www.3com.com	Promotion, Customer service
Abbott Laboratories	www.abbott.com	Promotion, Provision
AirTouch Communications	www.airtouch.com	Processing, Promotion
Alcoa	www.alcoa.com	Provision
Allegiance	www.allegiance.net	Promotion
Alltel	www.alltel.com	Promotion
Amazon.com	www.amazon.com	Processing, Customer service
American Airlines	www.aa.com	Promotion, Provision, Processing, Customer service
American Electric Power	www.aep.com	Customer service
American Express	www.americanexpress.com	Customer service, Promotion
American General	www.agc.com	Promotion, Provision
American Greetings	www.americangreetings.com	Promotion, Customer service
American Home Products	www.ahp.com	Promotion
American Medical Association	www.amaassn.org	Customer service
American Standard	www.americanstandard.com	Customer service, Provision
Ameritech	www.ameritech.com	Processing, Customer service, Promotion
Ameritrade	www.ameritrade.com	Processing, Customer service
AMP	www.amp.com	Promotion
AMR	www.amrcorp.com	Promotion
Anheuser-Busch	www.anheuser-busch.com	Promotion
AON	www.aon.com	Promotion, Customer service
Apple Computer	www.apple.com	Promotion, Provision, Customer service, Processing
Aramark	www.aramark.com	Provision, Customer service
Archer Daniels Midland	www.admworld.com	Promotion, Customer service

Communications of AIS Volume 3, Article 17   28
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Arrow Electronics	www.arrow.com	Provision
Ashland	www.ashland.com	Provision, Customer service
Association of Information Technology Professionals	www.aitp.org	Promotion, Provision
AT&T	www.att.com	Promotion, Provision, Processing, Customer service
Atlantic Richfield	www.arco.com	Promotion
AudioNet	www.audionet.com	Processing, Customer service
AutoNation	www.autonation.com	Processing, Promotion, Customer service
AutoWeb	www.autoweb.com	Customer service
Avnet	www.avnet.com	Promotion, Provision, Customer service
Avon Products	www.avon.com	Promotion, Customer service
Baker Hughes	www.bakerhughes.com	Customer service
Bear Stearns	www.bearstearns.com	Promotion, Provision, Processing, Customer service
BellSouth	www.bellsouth.com	Customer service, Promotion, Processing
Berkshire Hathaway	www.bershirehathaway.com	Customer service
Best Buy	www.bestbuy.com	Promotion
Bestfoods	www.bestfoods.com	Promotion
Bethlehem Steel	www.bethsteel.com	Customer service
Big Book	www.bigbook.com	Customer service
Bigfoot	www.bigfoot.com	Promotion, Provision, Processing, Customer service
Biography Online	www.biography.com	Customer service
Black & Decker	www.blackanddecker.com	Promotion, Customer service, Processing
Boeing	www.boeing.com	Provision, Promotion, Customer service
Boise Cascade	www.boisecascade.com	Promotion, Provision
Bristol-Myers Squibb	www.bms.com	Promotion
Burlington Northern Santa Fe	www.bnsf.com	Customer service, Promotion
C|net	www.cnet.com	Promotion, Provision
Campbell Soup	www.campbellsoups.com	Customer service, Promotion
Cardinal Health	www.cardinalhealth.com	Promotion, Provision, Processing
Case	www.case.com	Promotion
Caterpillar	www.caterpillar.com	Provision
CDNOW	www.cdnow.com	Promotion, Processing, Customer service
Central & South West	www.csw.com	Provision
Charles Schwab	www.schwab.com	Processing, Provision, Customer service
CHS Electronics	www.chse.com	Promotion
Chubb	www.chubb.com	Processing, Customer service
Cigna	www.cigna.com	Customer service
Circuit City Group	www.circuitcity.com	Promotion, Customer service
Cisco Systems	www.cisco.com	Provision

Communications of AIS Volume 3, Article 17   29
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Citigroup	www.citigroup.com	Provision, Promotion, Customer service, Processing
City.Net	www.city.net	Customer service, Promotion
CMS Energy	www.cmsenergy.com	Provision
CNN Interactive	www.cnn.com	Customer service, Provision
Coca-Cola	www.coca-cola.com	Promotion, Customer service
Colgate-Palmolive	www.palmolive.com	Promotion
Columbia Energy Group	www.columbiaenergygroup.com	Customer service
Columbia House	www.columbiahouse.com	Promotion, Customer service, Processing
Columbia/HCA Healthcare	www.columbia-hca.com	Promotion
Comcast	www.comcast.com	Provision
CompUSA	www.compusa.com	Promotion, Customer service
Computer Associates	www.cai.com	Promotion
Conseco	www.conseco.com	Provision, Promotion
Continental Airlines	www.continental.com	Promotion, Provision, Processing, Customer service
Cooper Industries	www.cooperindustires.com	Promotion
Corning	www.corning.com	Promotion, Provision
Corporate Express	www.corporateexpress.com	Processing, Customer service
Crown Cork & Seal	www.crowncork.com	Promotion
Cummins Engine	www.cummins.com	Promotion, Provision, Customer service
Dell Computer	www.dell.com	Customer service, Promotion, Processing
Delta Airlines	www.delta-air.com	Processing
Dillard's	www.dillards.com	Promotion, Provision, Processing, Customer service
DljDirect	www.dljdirect.com	Promotion, Processing, Customer service
Dow Chemical	www.dow.com	Provision, Customer service
Duke Energy	www.duke-energy.com	Provision, Customer service
Dynegy	www.dynegy.com	Promotion
E! Online	www.eonline.com	Promotion
Eastman Chemical	www.eastman.com	Customer service, Processing
Eastman-Kodak	www.kodak.com	Promotion, Processing, Customer service
Edison International	www.edison.com	Promotion
Egghead Software	www.egghead.com	Promotion, Customer service, Processing
Electric Data Systems	www.eds.com	Promotion, Customer service
Elibrary	www.elibrary.com	Customer service
Emerson Electric	www.emersonelectric.com	Promotion, Customer service
Entergy	www.entergy.com	Promotion, Customer service, Processing
ESPNet Sportzone	www.sportzone.com	Customer service, Promotion, Processing
Etrade	www.etrade.com	Promotion, Processing, Customer service
Excite Inc.	www.live.excite.com	Customer service
Exxon	www.exxon.com	Provision, Promotion

Communications of AIS Volume 3, Article 17   30
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Family Tree Maker	www.familytreemaker.com	Customer service
FAQ Schwarz	www.faoschwarz.com	Promotion, Customer service, Processing
FDX	www.fdxcorp.com	Promotion, Customer service, Processing
Federal-Mogul	www.feder-mogul.com	Promotion
Federated Department Stores	www.federated-fds.com	Customer service
Firefly	www.firefly.com	Promotion
First Data	www.firstdatacorp.com	Promotion
First Union Corp.	www.firstunion.com	Customer service
Ford Motor	www.ford.com	Promotion, Processing, Customer service
Foster Wheeler	www.fwc.com	Promotion
FPL Group	www.fplgroup.com	Customer service, Promotion
Fred Meyer	www.fredmeyer.com	Promotion, Customer service
Freddie Mac	www.freddiemac.com	Customer service, Processing
Gamelan	www.gamelan.com	Promotion
Gannett	www.gannett.com	Provision
Gateway 2000	www.gateway.com	Customer service, Processing, Promotion
General Dynamics	www.generaldynamics.com	Promotion
General Electric	www.ge.com	Promotion, Provision, Customer service, Processing
General Mills	www.generalmills.com	Promotion
General Motors	www.gm.com	Promotion, Processing, Customer service
Georgia-Pacific	www.gp.com	Promotion
Gillette	www.gillette.com	Promotion, Provision
Goodyear Tire & Rubber	www.goodyear.com	Promotion, Provision, Processing
Guardian Life Ins.	www.theguardian.com	Promotion, Provision, Customer service
Harvard University	www.harvard.edu	Provision, Customer service
Hershey Foods	www.hersheys.com	Customer service, Processing
Honeywell	www.honeywell.com	Promotion
Hotwired	Hotwired.lycos.com	Promotion
Houston Industries	www.reliantenergy.com	Promotion
IBP	www.ibpinc.com	Promotion
Ikon Office Solutions	www.ikon.com	Promotion
Ingram Micro	www.ingrammicro.com	Processing
Inquiry.com	www.inquiry.com	Provision, Customer service
Internal Revenue Service	www.irs.gov	Provision, Customer service
International Business Machines	www.ibm.com	Provision, Promotion, Processing, Customer service
International Paper	www.internationalpaper.com	Promotion, Provision
Internet Movie Database	www.imdb.com	Promotion, Customer service
Internet.com	www.cyberatlas.com	Customer service
ITT Industries	www.ittind.com	Customer service
J.P. Morgan & Co.	www.jpmorgan.com	Promotion
JCPenney	www.jcpenney.com	Processing, Customer service

A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Joe Boxer	www.joeboxer.com	Processing, Customer service
John Hancock Mutal Life Ins	www.jhancock.com	Promotion, Customer service
Johnson & Johnson	www.johnsonandjohnson.com	Customer service, Promotion
Johnson Controls	www.jci.com	Promotion, Provision
Kellogg	www.kelloggs.com	Promotion, Customer service
Kid's World	www.kidsworld.com	Provision, Promotion
Kimberly-Clark	www.kimberly-clark.com	Promotion, Provision
Las Angeles Times	www.latimes.com	Provision, Customer service
Liberty Mutual	www.libertymutual.com	Promotion, Customer service
Library of Congress	www.loc.gov	Customer service
Lincoln National	www.lincolnnational.com	Promotion, Provision, Customer service
LiveConcerts	www.liveconcerts.com	Customer service
Loews	www.loews.com	Provision
Looksmart	www.looksmart.com	Customer service
Manpower	www.manpower.com	Processing, Customer service
MapQuest	www.mapquest.com	Processing
Marriott International	www.marriott.com	Promotion, Provision, Customer service, Processing
Mass.Mutual Life Ins.	www.massmutual.com	Promotion
Massachusetts Institute of Technology	www.mit.edu	Provision, Customer service
Match.com	www.match.com	Promotion, Provision, Customer service
Mattel	www.mattel.com	Processing
May Department Store	www.mayco.com	Promotion
MBNA	www.mbnainternational.com	Customer service, Processing
McDonald's	www.mcdonalds.com	Promotion, Provision, Customer service
McGraw-Hill	www.mcgraw-hill.com	Promotion, Provision
MCI WorldCom	www.wcom.com	Customer service, Processing, Promotion
McKesson HBOC	www.mckesson.com	Processing
Mead	www.mead.com	Promotion
Med Partners	www.medpartners.com	Provision, Processing
Mercury Center	www.sjmercury.com	Provision, Customer service
Merisel	www.merisel.com	Customer service
MicroAge	www.microage.com	Provision, Promotion
Microsoft	www.microsoft.com	Customer service, Promotion
Microsoft Expedia	www.expedia.msn.com	Customer service, Processing
Microsoft Investor	www.investor.msn.com	Customer service
Minnesota Mining & Mfg	www.mmm.com	Promotion
MIT Media Lab	www.media.mit.edu	Provision
MovieLink	www.777film.com	Customer service
Mr. Showbiz	www.mrshowbiz.com	Provision
Museum of Modern Art	www.moma.org	Promotion
Nasa	www.nasa.gov	Promotion
National Geographic	www.nationalgeographic.com	Customer service, Processing, Provision
National Public Radio	www.npr.com	Provision, Promotion

Communications of AIS Volume 3, Article 17   32
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Nationwide Insurance	www.nationwide.com	Promotion, Customer service
Navistar International	www.navistar.com	Promotion, Provision, Processing, Customer service
NCR	www.ncr.com	Customer service, Processing
Nerd World	www.nerdworld.com	Provision
Netscape	www.netscape.com	Promotion, Provision, Processing, Customer service
New York Like Insurance	www.newyorklife.com	Customer service
Nordstrom	www2.nordstrom.com/shop/	Processing, Customer service
Northwest Airlines	www.nwa.com	Promotion, Provision, Processing, Customer service
Northwestern Mutual Life Ins.	www.northwesternmutual.com	Customer service, Promotion
Office Depot	www.officedepot.com	Promotion
Olsten	www.olsten.com	Promotion
Owens-Corning	www.owens-corning.com	Processing
Oxford Health Plans	www.oxhp.com	Promotion
Paccar	www.paccar.com	Provision, Promotion
Parent Soup	www.parentsoup.com	Provision
Parker Hannifin	www.parker.com	Promotion
PECO Energy	www.peco.com	Promotion
PepsiCo	www.pepsico.com	Promotion
Pfizer	www.pfizer.com	Promotion
Pharmacia & Upjohn	www.pnu.com	Customer service, Promotion
Phillip Morris	www.phillipmorris.com	Provision, Promotion
Phillips Petroleum	www.phillips66.com	Promotion, Customer service
PNC Bank Corp.	www.pncbank.com	Promotion, Provision, Processing, Customer service
PPG Industries	www.ppg.com	Promotion
Progressive	www.progressive.com	Promotion, Processing
Public Service Enterprise Group	www.publicservice.org	Promotion, Provision
Quote.com	www.quote.com	Customer service, Processing
Ralston Purina	www.ralston.com	Provision
Raytheon	www.raytheon.com	Promotion
Rite Aid	www.riteaid.com	Customer service, Provision, Processing
RJ Nabisco Holdings	www.rjrnabisco.com	Customer service
Ryder System	www.ryder.com	Promotion
Safeco	www.safeco.com	Provision, Customer service
Saks	www.saks.com	Promotion, Customer service, Processing
Sandy Bay Software's PC Webopaedia	www.sandybay.com	Provision, Promotion, Customer service
Scholastic Network	www.scholastic.com	Provision
SCI Systems	www.sci.com	Customer service, Processing
Science Applications International	www.saic.com	Provision
Scientific American	www.sciam.com	Provision
Seagate Technology	www.seagate.com	Customer service
Sempra Energy	www.enova.com	Provision

Communications of AIS Volume 3, Article 17   33
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
ServiceMaster	www.servicemaster.com	Promotion
Sodexho Mariott Services	www.sodexhomarriott.com	Customer service, Provision
Solectron	www.solectron.com	Promotion, Processing
Sonat	www.sonat.com	Provision
Sony	www.sony.com	Promotion. Provision, Customer service
Southern	www.southernco.com	Promotion
Sprint	www.sprint.com	Promotion, Customer service, Processing
Stroud's CWS Apps List	www.stroud.com	Provision, Processing
Suck	www.suck.com	Provision
Sun Microsystems	www.sun.com	Promotion, Customer service
Sunoco	www.sunocoinc.com	Provision, Customer service
SunTrust Banks	www.suntrust.com	Customer service, Processing
SupportHelp.com	www.supporthelp.com	Provision, Customer service
Switchboard	www.switchboard.com	Provision, Promotion
Sysco	www.sysco.com	Promotion
Tandy	www.tandy.com	Processing
Tech Data	www.techdata.com	Promotion, Customer service, Provision
Tenneco	www.tenneco.com	Customer service
Texas Instruments	www.ti.com	Provision
Texas Utilities	www.tu.com	Provision
Textron	www.textron.com	Promotion, Customer service, Provision
The Old Farmer's Almanac	www.almanac.com	Provision
The Onion	www.theonion.com	Provision
The Weather Channel	www.weather.com	Provision
The Why Files	whyfiles.news.wisc.edu	Provision
Time Warner	www.timewarner.com	Promotion, Processing
Time Warner	www.pathfinder.com	Promotion, Customer service
TimeCast Network	www.real.com	Customer service
TJX	www.tjx.com	Provision, Promotion
TMCS	www.citysearch.com	Customer service
Tosco	www.tosco.com	Promotion, Customer service
Toyota Motor	www.toyota.com	Promotion, Provision, Customer service
Toys'R'Us	www.tru.com	Processing, Customer service
Transamerica	www.transamerica.com	Promotion, Customer service
Tricon Global Restaurants	www.triconglobal.com	Promotion
TRW	www.trw.com	Promotion
Tucows	www.tucows.com	Processing, Customer service
Tunes.com	www.tunes.com	Promotion, Customer service, Processing
Tuneup.com	www.tuneup.com	Customer service
Tyson Foods	www.tyson.com	Customer service, Promotion
U.S. Foodservice	www.usfoodservice.com	Provision
UAL	www.ual.com	Customer service, Promotion
Ultramar Diamond Shamrock	www.udscorp.com	Promotion
Union Camp	www.internationalpaper.com	Provision

Communications of AIS Volume 3, Article 17   34
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Name	URL	Purposes
Union Pacific	www.up.com	Promotion
Unisource	www.unisourcelink.com	Promotion
United HealthCare	www.uhc.com	Promotion
University of Memphis	www.memphis.edu	Promotion, Provision
Unocal	www.unocal.com	Promotion
Unum	www.unum	Processing
US Airways Group	www.usair.com	Promotion, Customer service
US West	www.uswest.com	Promotion, Provision, Customer service, Processing
USA Today	www.usatoday.com	Provision
UtiliCorp United	www.utilicorp.com	Promotion, Provision
Valero Energy Corp.	www.valero.com	Provision
VF	www.vfc.com	Promotion
Viacom	www.viacom.com	Promotion, Provision, Customer service
Wall Street Journal	www.wsj.com	Provision, Customer service
Wal-Mart Stores	www.walmart.com	Promotion, Processing, Customer service
Walt Disney	www.disney.com	Promotion
Warner-Lambert	www.warnerlambert.com	Promotion, Provision
Waste Management	www.wastemanagement.com	Promotion, Provision
Webreference.com	www.webreference.com	Promotion
Wellpoint Health Networks	www.wellpoint.com	Provision, Processing
Weyerhaeuser	www.weyerhaeuser.com	Promotion, Provision
Whirlpool	www.whirlpool.com	Promotion, Customer service
White House	www.whitehouse.gov	Provision, Customer service
WhoWhere?	www.whowhere.com	Provision, Promotion
Willamette Industries	www.wii.com	Provision
WKRP in Cincinnati	www.tir.com/~rtw/krp.htm	Promotion, Provision
Yahoo	www.yahoo.com	Customer service, Promotion, Processing
You Don't Know Jack	www.bezerk.com	Promotion, Customer service
Zdnet	www.zdnet.com	Promotion, Provision
Zoloft	www.spectacle.com	Promotion, Customer service

ABOUT THE AUTHORS

Mark L. Gillenson is Professor of Management Information Systems in the Fogelman College of Business and Economics of the University of Memphis in Memphis, TN. He received his B.S. degree in Mathematics from Rensselaer Polytechnic Institute and his M.S. and Ph.D. degrees in Computer and Information Science from The Ohio State University. Dr. Gillenson worked for the IBM Corp. for 15 years in a variety of positions, including seven years as a faculty member of the prestigious IBM Systems

Communications of AIS Volume 3, Article 17   35
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Research Institute. Subsequently, he was a professor at the University of Miami, Miami FL. Dr. Gillenson's areas of interest are electronic commerce, database administration and database design. He is an associate editor of the Journal of Database Management and of the journal Pattern Recognition. Dr. Gillenson's research has appeared in MIS Quarterly, Communications of the ACM, Methods of Information in Medicine, and other leading journals. His books include Strategic Planning, Systems Analysis, and Database Design, 1984, and Database: Step-by-Step, Second Edition, 1990, both published by John Wiley & Sons.

Daniel L. Sherrell is Professor of Marketing, Associate Dean for Faculty, and Director of the Sparks Family Marketing Center at the University of Memphis. Dr. Sherrell joined the University of Memphis faculty in August, 1995. Prior to that he spent 15 years on the faculty at Louisiana State University. He received his Ph.D. from the University of South Carolina in 1980. Dr. Sherrell has published over 30 articles in refereed journals and national conference proceedings. His research has appeared in the Journal of Consumer Research; Journal of Academy of Marketing Science; Psychology & Marketing; Journal of Personal Selling and Sales Management; and Industrial Marketing Management. His current research interests center around the impact of information technology on the practice of marketing strategy customer satisfaction and quality judgments for services; and consumer price/value judgements. Dr. Sherrell has served as Program Chair and President of the Southwestern Marketing Association, as well as Associate Editor for the Journal of Academy of Marketing Science. As a consultant, Dr. Sherrell has worked with a variety of firms in the areas of customer satisfaction and quality benchmarking, as well as strategic marketing planning.

Lei-Da Chen is Assistant Professor of Computer Information Systems in Walker L. Cisler College of Business of Northern Michigan University. His research interests are electronic commerce, data warehousing and mining, and end-user computing. He received his Bachelor of Business Administration degree in Computer Information Systems and Master of Business Administration degree in MIS from the University of Central Arkansas. His works have been published in Information & Management, Communications of AIS, Journal of Management Systems, Information Systems Management, Electronic Markets, and Journal of Education for MIS.

Communications of AIS Volume 3, Article 17   36
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Communications of AIS Volume 3, Article 17   37
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen

Communications of AIS Volume 3, Article 17   38
A Taxonomy of Web Site Traversal Patterns and Structures
by M.L. Gillenson, D.L. Sherrell, and L. Chen