

DOCUMENT RESUME

ED 391 481

IR 017 634

AUTHOR Ma, Yan  
 TITLE A Semiotic Analysis of Icons on the World Wide Web.  
 PUB DATE [95]  
 NOTE 10p.; In: Eyes on the Future: Converging Images, Ideas, and Instruction. Selected Readings from the Annual Conference of the International Visual Literacy Association (27th, Chicago, IL, October 18-22, 1995); see IR 017 629. Contains illustrations which may not reproduce clearly.  
 PUB TYPE Reports - Research/Technical (143) -- Speeches/Conference Papers (150)  
 EDRS PRICE MF01/PC01 Plus Postage.  
 DESCRIPTORS Computer Graphics; \*Computer Interfaces; Cultural Awareness; \*Hypermedia; Information Retrieval; Information Sources; Internet; Library Services; Multimedia Materials; Online Searching; \*Screen Design (Computers); \*Semiotics; \*Visual Aids; Visual Literacy  
 IDENTIFIERS Cultural Content; Home Pages; \*Iconicity; \*World Wide Web

ABSTRACT

The World Wide Web allows users to interact with a graphic interface to search information in a hypermedia and multimedia environment. Graphics serve as reference points on the World Wide Web for searching and retrieving information. This study analyzed the culturally constructed syntax patterns, or codes, embedded in the icons of library homepages on the Web. For example, most hypertexted words are highlighted in blue and underlined, while most hypertexted graphics are framed in blue borders. Quantitative analysis was conducted on the segments of icons, ascertaining how often a particular icon is used to index the same type of resource, or how many different types of icons are used to index the same type of resource. Subsequent qualitative analysis studied the meanings and connotations of the icons. Research focused on those icons which point to the catalog, to references services, or to collections. Recurring icons included the book, the person-at-desk, the word "new" to indicate recently added services or details, the highway, or the magnifying glass. Their frequent use indicates the emergence of a unique Internet culture. Illustrations of two library home pages are included, along with the appropriate World Wide Web addresses, or uniform resource locators (URLs). (Contains 23 references.) (BEW)

\*\*\*\*\*  
 \* Reproductions supplied by EDRS are the best that can be made \*  
 \* from the original document. \*  
 \*\*\*\*\*

# A Semiotic Analysis of Icons on the World Wide Web

U.S. DEPARTMENT OF EDUCATION  
Office of Educational Research and Improvement  
EDUCATIONAL RESOURCES INFORMATION  
CENTER (ERIC)

- This document has been reproduced as received from the person or organization originating it.
- Minor changes have been made to improve reproduction quality.

- Points of view or opinions stated in this document do not necessarily represent official OERI position or policy.

by Yan Ma

"PERMISSION TO REPRODUCE THIS MATERIAL HAS BEEN GRANTED BY

Alice D. Walker

TO THE EDUCATIONAL RESOURCES INFORMATION CENTER (ERIC)."

## Introduction

The World Wide Web (WWW) allows users to interact with graphic interface to search information in a hypermedia/multimedia environment. Graphics including color lines serve as indexes or reference points on the World Wide Web for searching and retrieving information including texts, visuals, and sound materials in a non-linear fashion. This study examines the codes embedded in the icons on library homepages of Webs. Icons in this study refer to iconic indexial signs. Codes are syntax patterns that are culturally constructed. They have paradigmatic meanings. A semiotic analysis of the icons used for information retrieval purposes on the library homepages is presented here. A further study on how the icons influence users' information seeking behavior is being conducted.

## Theoretical Construct

Semiotics is the theory of signs. As Eco explains that semiotics "studies all cultural processes as *processes of communication*" (Eco, 1979, p. 8). Ann DeVaney's semiotic model for the analysis of social and cultural issues in educational television is used for the study. Her model was based on the theories of

Ferdinand de Saussure, Roland Barthes, and Christian Metz who emphasize that knowledge is socially constructed through language or communication systems. In other words, meaning is socially and culturally built. The concept of sign contains two aspects: **signifier**, which is the sound-image and **signified**, which is the concept. For example, the relationship between the concept of a "book" (the signified) and the sound-image made by the word "book" (the signifier) forms a sign. "Signs are further organized into systems of meanings or codes" (Muffoletto, 1994, p. 302). Semiotics, like structuralism, studies the relationship between form and meaning. "Signs are assigned meaning based on historic patterns of use that are recognized within social/cultural groups. These patterns of use are called codes" (Pomper, 1988, p. 18). A sign comprises of two types of meanings: syntagmatic and paradigmatic meanings. Syntagmatic meaning refers to the meaning that is assigned based on syntax, or based on the relationships among signs. Paradigmatic meaning is derived from other systems or codes. The icons on the homepages of the WWW carry meaning dependent on the syntax of their use. They also carry paradigmatic

meanings derived from other systems or domains.

### Selection of Icons

C. S. Peirce (1958) categorized signs into three types: the index, the icon, and the symbol. An *index* bears a clear direct relationship between object and what it means, such as the relationship between smoke and fire. An *icon* has a physical resemblance relationship between an object and its meaning, such as a photograph of a person. A *symbol*, quite unlike the index and icon, has no inherent relationship between the object and its meaning, but derives all meaning from cultural convention (Sewell, 1994, p. 137). In this study, the term "icon" refers to iconic signs and indexual signs. Icons selected from library homepages belong to these two categories.

Stratified sampling, a social science research design is used to ensure that appropriate numbers of elements are drawn from homogeneous subsets of that population (Babbie, 1990, p. 86). Stratified sampling achieves a greater degree of representativeness of a sample. It allows me to select icons based on their representative characteristics. Instead of including all the homepages on the WWW, this study draws samples from more 200 library homepages on the WWWs, some of which contain iconic signs and indexual signs to index resources.

According to Cleveland, "an index can be defined as an orderly guide to the intellectual content and physical location of knowledge records. ... An index is a pointer or guide and as such does not generally supply the desired information itself" (Cleveland, 1990, p. 26). Literature on how to index books and visual images has focused on the efforts made to index these materials or objects.

Nothing has been documented on how the icons on the WWW have been used as index pointers to play a role in retrieving information on the Web. These index pointers are created by people in various fields who may or may not have professional training in indexing.

### Research Method

The research method for this study is based on Ann DeVaney's model for semiotic analysis of educational television (DeVaney, 1991, p. 268). It consists of five phases: format identification, segment identification, elements of construction identification, quantitative analysis, and qualitative analysis. In the domain of television, formats may include educational television, comedy, dramatic narrative, etc. Segments may be the beginning, end, or climax for a television program. Elements of construction may include the syntax in the visual track, such as frame, shot, and sequence. The fourth and fifth phases are to analyze the form and meaning of the media.

For this study, the format is library WWW homepages. Libraries and information centers in the United States and other countries in the world have been introducing computerized information retrieval systems to their users for more than two decades. Information retrieval systems and services available in most of the academic and public libraries in the United States include online database searching, CD-ROM searching, online public catalogs, other related systems, and more recently Internet access to electronic resources. With the building of the information superhighway, users are no longer limited to the resources in a particular library or in a specific form. Information on the Internet represent several formats. For example, users can

retrieve information through Gopher, a menu-driven system, or, WAIS, a text-based system. What differs from traditional information retrieval systems or other systems on the Internet is that the WWW is a graphic interface based system. The WWW offers a multimedia experience for Internet users through graphic browsers such as Mosaic, Cello, and Netscape. Many iconic and indexical signs appear on homepages to guide users to different information sources.

The second phase is the identification of segments. Segments here are defined as specific icons used to index library resources, for example, the icon for the library, the icon for online catalog, the icon for references, and the icon for collection. Since library catalogs, reference services, and collections are the three major functions of library operations, they have been chosen as the resources on the library homepages for the study. This study analyzes the sample icons used to index library catalog, collection, and reference services on the library homepages.

The third phase is to identify the codes and syntax embedded in the icons. This study uses semiotics and structuralist theories and their methodological approaches to studying cultural messages. According to structuralist view, meaning is created based on the form or structure of the materials. However, codes and syntax are culturally constructed, which shape the meanings of messages conveyed in the icons. A user may construct meaning in a social manner. Codes are created by conventions of production that are repeated daily. Based on John Fiske's writing, Kervin (1984) explains that "everyone learns how to perceive the world through codes; these same codes are then replicated within the

cultural products (p. 82). DeVaney (1991) also states that "codes are rules of relationships and derive from specific syntax. They do, however, have paradigmatic meaning embedded in them" (p. 259). Just like language has its syntax structure, a television program segment has its syntax, a computer language also has its syntax, so do the icons on the Web homepages. The syntax in the WWW are basically in four formats at present. First, the hypertexted words are mostly highlighted in blue color and/or underlines although there are exceptions. One can click on the colored part(s) to get further information. Second, some icons are framed in blue borders, which are clickable. The hypertexted icons lead users to further information. Third, some clickable icons are within a bigger graphic image. There are multiple clickable icons within the bigger image. Fourth, one of the new features in Netscape, a WWW browser, is to allow the hypertexted region to blink so that it catches users' attention to click on this area to read more information.

The fourth phase is to carry out a quantitative analysis of the structure of icons used for index purposes on the library homepages. It answers such questions as "How many times is a particular icon used to index the same type of resource on the library homepages?" "How many different types of icons are used to index the same type of resource?"

The fifth phase is to conduct a qualitative analysis of the meanings of icons used to index resources on the library homepages. It analyzes the interaction of structure and resources in terms of its connotations of the icons. If the same icons are used to index the same type of resources on different homepages,

how do these icons interact with the resources they indexed. If the same icons used to index different type of resources, how do these icons interact with the resources they indexed. Semiotics provides a theoretical base for the analysis.

### Focus Questions

In order to study the structure and meaning of icons on the library homepages, the following focus questions are developed:

1. What are the codes embedded in the icons on the library homepages?
2. What are the original meanings of the codes?
3. How do the meanings of the codes in their original domains or formats compare and contrast to the codes embedded in the icons in this study?
4. Why were these codes used in the icons on the library homepages?
5. How are the icons used to index the resources on the homepages?
6. How many times a particular icon is used to index the same type of resources?
7. How many different icons are used to index the same type of resources?
8. Do the icons help retrieve information?
9. Do the codes embedded in the icons have influence on retrieval the information?

### Quantitative Analysis

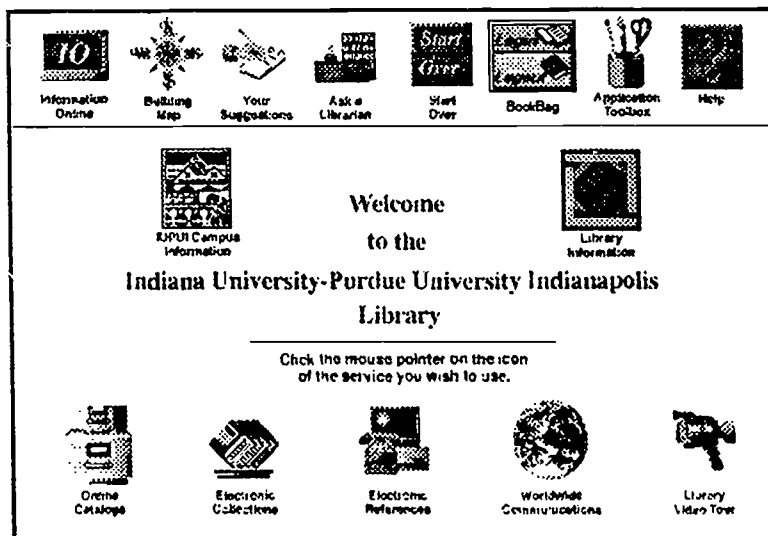
The author examined 150 United States library homepages. Among which 50 homepages contain icons that are used to index various resources. Since the author focused on three types of resources of library services, i.e., catalog, reference services, and collection, more

attention was paid to examining icons used for these type types of resources.

1. Catalog. Similar icons such a book or books are used to indicate "catalog" or "online catalog." But book icons are also used to index "collection" or "reference shelf."

2. Reference Services. The traditional reference services is identified as such that users can approach the reference librarians to seek information or help. In this environment, users need mediators to direct them to the information resources. In the networked environment, the users are in a self-service condition. Not many icons are found for traditional references services. One of the multiple icons in the Indiana University--Purdue University Indianapolis Library's homepage is "Ask A Librarian" which contains an image of a stereotype reference desk where sits a person with a bookshelf behind her/him. The other icon is an image of a computer with a telephone on top of a modem to identify "Electronic References." This shows the

**Figure 1**  
**IUPUI Library Homepage**



(Source: <http://www.medlib.iupui.edu>)

change from the traditional references to the self-services available through the Internet.

3. Collection. The concept of collection is definitely not limited to the books, periodicals, videos, and manuscripts, but the vast amount of information in multimedia format on the Internet resources. Icons are used to index such resources as "Gateway to Information," "Gopher Services," "World Communications," "Electronic Collections," etc. The concept of traditional collection includes print and non-print materials held in a library. Information on the Internet may include periodical articles, biographies, reviews, dictionaries, encyclopedias, statistics, etc.

**Figure 2**  
**Ohio State University Library**  
**Homepage Section**



(Source: <http://www.lib.ohio-state.edu>)

### Qualitative Analysis

Meanings are constructed based on both structure of the icons and the resources in the WWW, and on their interaction. By gathering both structural and contextual information from the sample icons to create an outline of their denotative level, a full examination of their cultural meanings could then be undertaken. This part of the study is to answer the following focus questions:

1. What are the codes embedded in the icons on the library homepages?
2. Where are the original meanings of the codes?
3. How do the meanings of the codes in their original domains or formats compare and contrast to the codes embedded in the icons in this study?
4. Why were these codes used in the icons on the library homepages?
5. How are the icons used to index the resources on the homepages?

The author selected sample icons for the qualitative analysis. First, the author traced the origin of the meanings of these icons used to index catalogs, references, and collections. Icons of a Rolodex box and books are selected.

**Figure 3**  
**"The Card Catalog"**



(Source: <http://www.kerr.orst.edu:80/info/bull/libgde/lghome.html>)  
"BPL's Index to the Internet"  
(Source: <http://www.ci.berkeley.ca.us/bpl>)

The original meaning of a Rolodex is a file box for filing business or addresses cards. It is a way to organize the information for easy access. The Rolodex icon on the library WWW homepages is to index both card catalog and the Internet resources.

**Figure 4**  
**"Library Online Catalog"**



(Source: <http://www.nalusda.gov>)

The original meanings of books are related reading, learning, and studying. Book icons are used to index library catalogs including online catalogs, collections, encyclopedia, and periodicals.

Various computer icons are used on library Web homepages to index online catalogs, databases, Internet resources, and electronic references.

Because of the limited space for this paper, only a few of the icons can be presented here. The following is an analysis of some sample icons used in the library homepages which carry codes with strong cultural meanings.

**Figure 5**  
**"Encyclopedia Britannica Online"**



(Source: <http://www.lib.lehigh.edu>)

The icon "new" appears on many library homepages to index newly added resources and newly added hypertexted links. Originally, the icon "new" was used on commercial products to tell the consumer that this is a new product or new improvements have been made to the products. The intention is to attract the consumers' attention. Borrowing this icon to index the newly added resources and links on the library homepages is to attract the users to use the new resources.

**Figure 6**  
**"Search and Explore the Information Highway"**

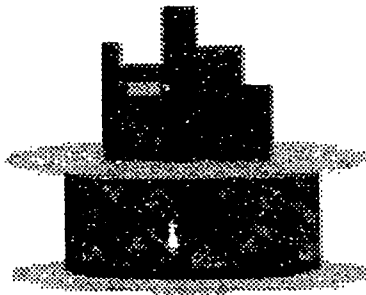


(Source: <http://www.library.drexel.edu>)

This "highway" icon appears on many computer game screens. It represents a common highway in the United States. The "highway" icon is used on library homepages to index resources on the Internet, which is an information superhighway.

These sample icons provide direct and/or indirect assistance with users' information retrieval. Many misleading, confusing, meaningless icons are also used to index resources on the library homepages. For example,

**Figure 7**  
**"The Ethics Collection"**



(Source: <http://www.library.drexel.edu>)

This particular icon is used to index a ethics collection. The author has asked four different individuals to interpret this icon, none of them could understand why this icon is used for this purpose.

**Figure 8**  
**"Let's Search the Internet"**



Source: <http://ws1.databank.com/~lawrlibr>)

This icon is used to index the Internet resources. Without a high resolution monitor, it is hard to tell what this icon is. Vaguely, the icon shows a Web and a magnifying glass. How much help a use can get from this icon to search information? It is hard to determine. May be it is as vague and confusing as the icons looks like.

### **Conclusions**

The conclusions of this pilot study resulted from the semiotic analysis of sample icons on the library Web homepages. As expressed in the focus

questions and qualitative analysis that this study investigates the structure, codes, the original meanings of the codes, and how the codes are represented in the icons. The results show the encoding process of icons, which carry cultural codes to index resources on the Webs. These codes are mainly rooted in Western culture and newly merging culture such as the Internet culture.

Since the Internet has been challenging and changing the way of how information is disseminated and used, new and different services, resources, and methods of organizing information have been intertwined with traditional library operations. The results of the study indicate that old icons are borrowed to index new resources and services on the Internet. Many icons are used to index new resources and services such as "Electronic Reference," "Electronic Collection," "Internet Resources," "Virtual Reference Desk," and so on. Applying semiotics to study the icons on the library Web homepages has challenged the traditional practice of indexing. It contributes to the research of indexing by analyzing the cultural codes embedded in the indexal signs used for index purposes.

Based on this pilot study, further studies on how the icons influence users' information retrieval can be carried out. The author will study the relationship between and the designer, text/icon, and user to investigate the meaning creation process and examine the user information seeking behavior.

[I wish to thank Professor Ann DeVaney for her advice on the paper and Mary Rowe for her continuous supply of URLs of library Web homepages and her interest in the project. Mary also served as my



interviewee to verify the codes in the icons.]

## Bibliography

- Babbie, Early (1990). *Survey research methods* (2nd ed.). Belmont, CA: Wadsworth Publishing Co.
- Barthes, Roland. (1964). *Elements of semiology*. New York: Hill and Wang.
- Besley, Catherine. (1980). *Critical practice*. London: Methuen.
- Cleveland, Ronald B. and Cleveland Anna D. (1990). *Introduction to Indexing and Abstracting* (2nd ed.). Englewood, CO: Libraries Unlimited.
- Culler, Jonathan. (1981). *The pursuit of signs: semiotics, literature, and deconstruction*. London: Routledge & Kegan Paul.
- De Saussure, Ferdinand. (1959). *Course in general linguistics*. New York: McGrall-Hill.
- De Vaney, Ann (1991). A grammar of educational television. In D. Hlynka and J. C. Belland (Eds.), *Paradigms Regained: the Uses of Illuminative, Semiotic and Post Modern Criticism as Modes of Inquiry in Educational Technology: A Book of Readings* (p. 241-280). Englewood Cliffs, New Jersey: Educational Technology Publications.
- Eagleton, Terry. (1983). *Literary theory: and introduction*. Menneapolis: University of Minnesota Press.
- Eco, Umberto. (1976). *A theory of semiotics*. Bloomington: Indiana University Press.
- Fiske, John. (1987). *Television culture*. London ; New York: Routledge.
- \_\_\_\_\_ and Hartley, J. (1978). *Reading television*. London: Methuen.
- Foster, Hal, (ed.). (1983). *The anti-aesthetic: essays on postmodern culture*. Port Townsend, WA: Bay Press.
- Gunraud, Pierre. (1975). *Semiology*. London ; Boston: Routlege & Kegan Paul.
- Hawkes, T. (1977). *Structualism and semiotics*. California: University of California Press.
- Hoopes, James. (1991). Peirce, Charles S. *Peirce on signs: writings on semiotic*. Chapel Hill : University of North Carolina Press.
- Kervin, Denise J. (1985). *Structure and meaning: a semiotic analysis of network television news*. Unpublished Doctoral Dissertation, University of Wisconsin-Madison, Madison, WI.
- Metz, Christian. (1974). *Language and cinema*. Paris: Mouton.
- Monaco, James (1977). *How to read a film*. New York: Oxford University Press.

- Muffoleto, Robert (1994).  
Representations: you, me, and them.  
In Moore, David M. and Dwyer,  
Francis M. (Eds.). *Visual Literacy: a  
Spectrum of Visual Learning* (pp.  
195-310). Englewood Cliffs, NJ:  
Educational Technology Publications.
- Nichols, Bill (1988). The work of culture  
in the age of cybernetic systems.  
*Screen. 29 (1)*, 22-46.
- Peirce, Charles S. (1958). *Values in a  
universe of chance: selected  
writings of Charles S. Peirce*.  
Garden City, New York: Doubleday.
- Pomper, Marjorie A. (1988). A semiotic  
analysis of LOGO in practice.  
Unpublished Doctoral Dissertation,  
University of Wisconsin-Madison,  
Madison, WI.
- Sewell, Edward H., Jr. (1994). Visual  
symbols. In Moore, David M. and  
Dwyer, Francis M. (Eds.). *Visual  
Literacy: a Spectrum of Visual  
Learning* (pp. 135-144). Englewood  
Cliffs, NJ: Educational Technology  
Publications.