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The Once and Future Library

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It was deja-vu all over again.

Attributed to 'Yogi' Berra
Manager and Catcher, New York Yankees

Introduction

In Fall 1995, a World Wide Web (WWW) virtual library was established to investigate the applicability of using a conventional library classification scheme as an organizational framework for enhancing identification, access and use of Internet resources ([McKiernan 1995](#)). Named CyberStacks(sm),

<http://www.public.iastate.edu/~CYBERSTACKS/>

this service has adopted an outline of the Library of Congress classification schedules as a system for indicating broad and specific relationships among selected Net resources ([LC Classification Outline 1990](#)). Since its establishment, resources selected for the CyberStacks(sm) collection have been limited to Net analogs of equivalent printed works, original Web Reference publications, as well as Internet resources which have Reference value. Almanacs, bibliographies, biographies, dictionaries, directories, handbooks and manuals are among the common types of Reference works that have been selected for the current collection. Presently, only works that can be classified within the Science (Q), Medicine (R), Agriculture (S) and Technology (T), or the Military (U) and Naval (V) sciences have been selected as candidate titles for inclusion.

De facto Virtual Sci-Tech Reference Collection

The majority of the resources incorporated within the CyberStacks(sm) collection are monographic or serial works, files, databases, or search services. All selected resources are full-text, hypertext, or hypermedia, and of a research or scholarly nature. In addition to being categorized, resources which are fully incorporated within the CyberStacks(sm) collection are annotated with a profile that concisely describes the subject coverage of the resource, its size, structure and as well as special features. A summary that succinctly describes how to effectively search or navigate the resource is also provided.

Although only a few dozen resources have been described, classified and fully incorporated within the CyberStacks(sm) collection, over five-hundred candidate sources have been reviewed and incorporated within its alphabetical Title Index ([Title Index 1996](#), [McKiernan 1996d](#)). While limited by the lack of full descriptions for all selected resources, CyberStacks(sm) has become a *de facto* science and technology Reference collection for several hundred colleges and universities, governmental agencies, research institutes, and individuals on six continents. In addition to providing users with direct and organized access to a selected collection of significant Web resources, it has also served as a vehicle to explore a variety of conventional and novel approaches to digital resource management.

Beyond Bookmarks

To substantiate the applicability of traditional library methods for the organization of Net sources and to identify alternative approaches that could enhance the CyberStacks(sm) model, we posted queries to several appropriate listservs and newsgroups in Spring 1996 requesting candidate resources that applied standard as well as non-standard library classification schemes or controlled vocabularies as a method for organizing Web resources. As nominations were received, they were reviewed and categorized and subsequently incorporated and hotlinked within a new clearinghouse entitled *Beyond Bookmarks: Schemes for Organizing the Web* ([McKiernan 1996b](#)). To date, several dozen sites have been listed in this clearinghouse. Recently, the frameworks, features and functionalities of selected sites in this clearinghouse were reviewed and analyzed ([McKiernan 1997a](#)). Those that can potentially further enhance CyberStacks(sm) are currently being evaluated. Since its establishment, *Beyond Bookmarks* has become a gateway to selected and organized Net resources for over one-hundred libraries, individuals and institutions worldwide. In June 1996, it was designated a Scout Report Selection Network Tool by InterNIC, the national Internet registration authority.

Icons

From the onset, we realized the inherent limitations of providing access to incorporated Web resources within the CyberStacks(sm) collection only through browsing. This recognition led to a variety of investigations of possible enhancements that could further facilitate identification and navigation of the collection. In considering ways to reduce the 'cognitive load and memory tasks' associated with Information Overload ([Chang and Rice 1993](#)), we decided to enhance identification of primary and secondary categories within CyberStacks(sm) by appending appropriate and relevant icons to all classes and subclasses within its hypertext LC classification outline. We believe that the addition of these graphic images assists the user in identifying the general subject of a category and expedites their selection in subsequent browsing of a category set

[\(Planned Enhancements 1996\)](#).

Cross-Classification Index

While we believed that such images enhance browsing of the CyberStacks(sm) structure, users who have critiqued our model clearly desire alternative pathways for locating resources. As a result of this expressed need, we created a separate index that offers users access to incorporated resources through an alphabetical listing of the subcategories associated with each resource ([Cross-Classification Index 1996](#)). Within this index, users can browse topics covered by described resources irrespective of their specific location within the Library of Congress classification scheme ([Murphy 1996](#)). This Cross-Classification Index is considered a prototype for a more advanced index that will allow users to search or browse a structured thesaurus of subject headings. The Edinburgh Virtual Library (EEVL), based at Heriot-Watt University, Scotland, the Engineering Electronic Library, Sweden (EELS), and INFOMINE developed by staff at the University of California-Riverside Library, are outstanding examples of sites that provide direct access or a search function for subject descriptors assigned to resources within their respective collections. This Fall, we initiated a preliminary review of efforts that provide resource access through a structured, hyperlinked, controlled vocabulary ([Net Projects 1996](#)) that we had proposed earlier in the year ([McKiernan and Ames 1996](#)). Although we have not yet created the exact functionality that we envisioned, we have established enhanced access to incorporated resources through a link from the title entry for such items in the Title Index ([Title Index 1996](#)) to the appropriate classification range within CyberStacks(sm) in which the specific resource is categorized. From within this classification range users can then browse through adjoining profiles to identify other resources of potential interest.

Project Aristotle(sm)

Since its establishment, the issue of scalability of the CyberStacks(sm) model has been a concern and one raised by some users over the past year. While we believe that conventional library classification systems and controlled vocabularies do offer an organizational framework for effectively identifying and using Web resources, their application, in most current environments, requires intensive effort to create and maintain. With an interest in expediting the incorporation of selected resources within an organized scheme, we decided to survey projects that investigating automated Web resource categorization. During July and August, several dozen projects, products and services that offer a form of automated organization were identified and subsequently profiled in a new clearinghouse entitled Project Aristotle(sm) ([McKiernan 1996j](#)). Among the projects with features and functionalities particularly relevant to the further enhancement of CyberStacks(sm) at this stage of its development are the Nordic WAIS/WWW ([Ardo and Koch 1994](#)) and the OCLC Scorpion ([Vizine-Goetz 1996](#)) projects. Each has not only endeavored to create enhanced access to Net resources by automatic categorization or organization of Web resources, but has also sought to extend such categorization to automatic classification, a more sophisticated application of existing and emerging technologies. Through this review we also identified a number of alternative approaches to Web resource organization. Among the most novel in organization and presentation is the use of a neural network algorithm to create self-organizing semantic maps for a selected collection of Net resources applied by Chen ([Chen 1996](#)) and colleagues at the University of Arizona for the University of Illinois digital library project. *Project Aristotle(sm)* has also been

designated a Scout Report Selection Network Tool by InterNIC.

'Use the Force, Luke!'

The tedium associated with identifying resources for inclusion in the CyberStacks(sm) has also prompted us to investigate other methods by which candidate resources can be more readily identified and selected for consideration for its collection. At a conventional level, the establishment and development of a bookmark repository of Web sites in science and technology to serve the practical needs of librarians within the Science and Technology Section of the Reference and Instructional Services Department at Iowa State University Library offers an excellent resource for the further development of the CyberStacks(sm) collection. While limited by the lack of full appropriate description and full value-added organization, this repository represents a selected and significant collection of Net resources which we believe does facilitate access to significant Web sites.

At a broader level, an experiment using the Net itself has proved very useful in identifying significant categories for priority treatment and incorporation within the CyberStacks(sm) collection ([McKiernan 1996i](#)). In an effort to incorporate the most relevant agriculturally-related Web Reference resources into the CyberStacks(sm) collection, a special site was established to obtain user preferences for those categories of greatest collective interest. In a posting made to a number of listservs and newsgroups in late August, users were invited to visit this site in September to select from categories and subcategories found within a hypertext outline of the Library of Congress classification schedule for Agriculture (S). They were requested to simulate the selection of topics that could meet an information need in some field of Agriculture. While no resources are incorporated within the outline at this time, the aggregate selection of topics by all users has provided exceptionally useful data for selecting specific resources for full description within the CyberStacks(sm) collection ([Participatory WWW Database Development: Agriculture \(S\) 1996](#)). Using these preferences as a guideline, we plan to identify these specific resources by the end of this year.

Library Agents(sm)

During the process of reviewing sites for *Project Aristotle(sm)*, we identified a number of efforts that have employed some form of intelligent software agent ([Adbu and Bar-Ner 1996](#), [Hermans 1996](#)) to enhance identification, selection or organization of Net resources. From our general investigation for this clearinghouse, we concluded that this technology had the potential of greatly facilitating the identification of appropriate candidate Web resources for the CyberStacks(sm) collection, and in late summer posted a query requesting information on sites that had applied intelligent agents to such library services as acquisitions, cataloging and collection development ([McKiernan 1996h](#)). While less than a handful of relevant projects have been identified to date, we believe that this technology offers the necessary functionality that can greatly facilitate the screening of relevant resources for the CyberStacks(sm) collection. We plan to continue our exploration of these technologies and to incorporate all appropriate projects and services in a new clearinghouse early next year.

Collection Development

Although through much of this year CyberStacks(sm) has served as a vehicle to explore the application of existing and emerging technologies to enhance its conventional and 'neo-conventional' approach to organization and access to Web information ([McKiernan 1997b](#)), there have also been selected efforts to fully incorporate additional resources into its collection. An opportunity to present an electronic poster at the annual meeting of the Medical Library Association provided a venue in which to collaborate with members of our Virtual Advisory Board for Selection and Collection Development ([Virtual Advisory Boards 1996](#)) and to select and incorporate several significant medically-related Reference Web resources into the Medicine (R) class within CyberStacks(sm) ([McKiernan 1996e](#)). Similarly, an opportunity to present a paper at meeting of the International Association of Technological University Libraries provided an opportunity to profile a range of Reference resources within the Technology (T) classification outline ([McKiernan 1996f](#)).

At the institutional level, a recent award of special grant funds to support collaboration with staff and clientele associated with the International Institute for Theoretical and Applied Physics (IITAP) and the Center for Indigenous Knowledge for Agriculture and Rural Development (CIKARD), two major international research centers based at Iowa State University, will allow for the full description and classification of all presently identified candidate Web resources in the fields of Physics, Chemistry and related sciences into the CyberStacks(sm) collection. In addition, resources in selected fields of the social sciences and humanities will also be identified and fully profiled as will new resources in Science and Technology to be identified during the grant period. Appropriate electronic journals from scholarly societies and publishers and selected non-Reference monographic works will also be profiled.

Participation

From its inception, users have played an essential role in shaping the CyberStacks(sm) model and its associated collection ([McKiernan 1996c](#)). In addition to providing support for the full incorporation of appropriate resources, our university grant will also enable the development, implementation and exploration of several new technical enhancements which we believe will significantly facilitate the participation of users. Beginning early next year, we will actively solicit recommendations for new sources for the CyberStacks(sm) collection through these and other features. We invite our colleagues from the academic library community to contribute to the further development of our virtual library by nomination of significant and relevant Web resources.

Feedback

We invite your comments about this article. Please send e-mail to [the editor](#) for possible inclusion in a future issue.

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