

A Clearinghouse for Astronomy Librarians: the PAM Web Site

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Abstract. The advent of the World Wide Web has enabled librarians to create and publish web sites that function as specialized reference tools, virtual clearinghouses. This paper will review how the PAM web site has evolved, and survey current developments in information architecture and web applications that may provide future site enhancements.

1. Introduction

The World Wide Web is one of the newest media. It is a phenomenon that has achieved an extraordinary florescence, to become almost a commonplace. And, we frequently speak of it as a place. Search engines are *starting points* for web exploration; they help us find web *sites* of interest. When we call a web site a clearinghouse, we are using the architectural metaphor to indicate that we expect the site to function as “. . . an agency for collection, classification and distribution especially of information . . .” (Webster’s Third New International Dictionary. 1967: 420). Another architectural metaphor that may apply is the concept of an emporium, defined as a “. . . center of activity that serves customers . . . carrying a great diversity of merchandise . . .” (Webster’s Third New International Dictionary. 1967: 744).

Since the PAM (Physics-Astronomy-Mathematics division of the Special Libraries Association [SLA]) web site¹ went public in 1995, a large body of writing has been produced on web site design and planning. New HTML tags, new plug-ins, more recent releases of browsers – all offer options for further development. At this point, with several years of experience to draw upon, we have the opportunity to evaluate the site and what we expect from it. David Stern has sounded the clarion call, “The ability to have the most experienced user-oriented librarians building navigational interfaces is a long awaited opportunity that calls out for action” (Stern 1995).

In this new, nonlinear medium (Gibson 1996), what should be included in our web site? What left out? What emphasized? How ordered? How navigated? Are new standards of evaluation needed? What guidance does our traditional information training offer in planning the next edition of the PAM web site?

Librarians are the ideal group to evaluate information offerings. We have always been involved in matching resources with users’ needs. We have devel-

¹<http://pantheon.yale.edu/~dstern/pamtop.html>



This is the web site of the Physics-Astronomy-Mathematics Division
of the Special Libraries Association.

News, additions & announcements

- **PAM Division Resources** Officers, Bulletin & Divisional Sponsors
 - **SLA Links**
 - **Web Workbench** Web resources for librarians
-

- **Physics**
 - **Astronomy**
 - **Mathematics**
 - **Computer Science**
-

Astronomy

- **Abstracts, Journals & Newsletters**
- **Catalogs and Data Archive Resources**
- **Guides and Directories**
- **Library Resources**
- **Object Indexed Resources (NED, SIMBAD)**
- **Organizations, Telescopes, Observatories**
- **Preprint Databases**
- **Software Archives**
- **Miscellaneous Resources**

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Figure 1. Physics-Mathematics-Astronomy (PAM) Web site home page: masthead, main menu, and astronomy section.

oped evaluative techniques and collection development policies for media ranging from paper to software. Judging an offering for content, authority, currency, and organization is still appropriate, whether the offering is a web site, or a paper-based reference book. Additional web-specific criteria include consistent availability and the presence of a site-specific search engine (Collins 1996). And librarians have been quick to gather enough web savvy to set up sites. In their book *Information Architecture for the World Wide Web*, Rosenfeld & Morville (1998) illustrate the value of the approach librarians bring to the information architecture of web sites. We are well situated to construct excellent web sites.

2. The Eisenberg-Berkowitz Model

The ultimate decisions about web site design and content must be based on the intended audience for the site. The PAM web site has a multifaceted audience: physicists, astronomers, mathematicians, computer scientists, and PAM members. With this assortment, how can the best content and the best arrangement be identified? The Eisenberg-Berkowitz Model of Information Problem-Solving (Eisenberg & Berkowitz 1990), utilized in research training in settings ranging from K-12 through graduate studies, has been expanded to provide a framework for web site evaluation and organization (Cottrell & Eisenberg 1997). Known as the Big Six, this model contains the steps:

1. Task Definition (define problem, identify information requirements)
2. Information-Seeking Strategies (determine range of sources, evaluate sources)
3. Location and Access (locate sources, find information within them)
4. Use of Information (extract information from sources)
5. Synthesis (organize and present information)
6. Evaluation (judge the product and the problem-solving process)

These steps are common sense and seem obvious. If we assume that the users of the web site will be coming to it while engaged in an information search, designing to these phases of activity will enable us to decide what to include as content and what navigational aids to add. I'll use this model to assess the PAM site in its role as a clearinghouse and emporium.

3. Step One: Task Definition

For instance, the step of "Task Definition" prompts a web designer to inform the user about the site's nature and purpose. As Margaret Rioux points out, "The distinction among public relations, advertising and vanity publishing has become blurred, making it difficult to evaluate Web sites for credibility and integrity" (Rioux 1997). It is important that the sponsorship of a site be immediately clear to the visitor. The site's scope note must explicitly characterize the intended audience. The PAM site currently provides only the most minimal identifying statement: "This is the web site of the Physics-Astronomy-Mathematics Division of the Special Libraries Association." The user is expected to read the headings and select any of interest. Depending on the user's screen size, the category "Computer Science," occurring near the bottom of the screen, may not be visible. Hence, the searcher with a computer science query may leave the site, unaware of the presence of useful links. If the page contained a more comprehensive statement of purpose and scope, users would be alerted to resources of possible interest.

When describing the motivation for establishing a home page for the IBM Thomas J. Watson Research Center, Falcigno and Green state, "Most of our customers are scientists and engineers with very specific information needs . . . Our goal for the home page was to design it in a way that provides access to useful information for our customers, while emphasizing the library's value-added service" (Falcigno & Green 1995). This statement addresses the subject

interests and skill levels of the intended audience. It also identifies the desire for the library to have a presence on the web. This type of statement of purpose should underlie the planning of each web site. On the PAM site, the astronomy component should have the range and currency of a high-level reference tool, one to which we can confidently refer our astronomers, and one to which we immediately turn when we find a dead link in our personal bookmark lists.

The often-repeated advice that the contents of a page should not exceed what can be viewed on a single screen will, if followed, aid the user. As will limiting the number of choices (links, buttons, table elements) per screen to between seven and nine (seven plus two), the range of elements people grasp most easily (Stover & Zink 1996). Rosenfeld & Morville (1998) refer to this as the seven plus-or-minus two rule, stating that more than ten options can overwhelm the user. Frenza & Hoffman (1997) suggest not more than 6 sections. Lists can be displayed as tables to eliminate scrolling.

4. Step Two: Information-Seeking Strategies

Users engaged in the second step, “Information-Seeking Strategies,” want to promptly comprehend the scope of the site and see how it is organized. The navigational aids must be planned and positioned to reveal the site structure to users who might enter at any of a number of points, for example, from a search engine “hit list.” A site map or index provides a way to find things quickly. A map of the PAM site would enable users to see the connections among the various sections of the site. Links to the site map, home page, and other segments of the site should be positioned on each screen, to enable the user to ascertain useful paths through the site. A simple navigation bar could be placed at the top or bottom of each screen. The one on the Astronomy page would show:

[PAM HomePage | Physics | Mathematics | Computer Science | Site Map]

It is with the information-seeking user in mind that site designers must evaluate the roles of graphics, backgrounds, animations, frames, sound, etc. Each element should make a contribution to the exposition of the site contents that balances any increase in site download time. The use of consistent page layout throughout the site can help the user register the unique information on each page and facilitate navigation. By placing a graphic of a star next to an item on an alphabetical list, a web author can communicate that item’s prominence to the user. The graphic can be designed for quick loading. But, the diversity of users’ equipment types and browsers should be considered in the selection of graphic and other special design elements.

5. Step Three: Location and Access

Step 3, “Location and Access,” covers both the discovery of the sources and finding useful information within the sources. Site promotion can include list-serv announcements alerting Web audiences to the site’s release and subsequent developments. Web designers should register their sites with major indexing and search engine utilities. This has not been done for the PAM site. Metadata tags

(information about information) have the potential for improving the resource discovery, and schemes such as the Dublin Core may improve search precision in the future (Lynch 1998). Librarians will want to monitor these developments and explore their implementation. Currently, specialized search utilities, such as WAIS, Excite, Swish, etc., can be customized to search the entire site, or, using devices such as buttons, forms, and pull-down menus, specific parts of it. Search utilities should support both known-item searches and browsing. And, it must be remembered, they don't always work consistently across platforms.

A new grouping of products, sometimes called middleware, offers the option of publishing web databases. Also called dynamic web pages, these applications connect a database of elements in tagged fields and a search interface that can take the user's query (often submitted on a fill-in form), convert it to SQL (Standard Query Language), poll the database, convert the response to HTML, and deliver it to the user's browser. There are several areas of the PAM web site that would benefit from a web database application. For instance, publishers are active in multiple subject areas. It is probable that Elsevier will be listed on our web site in the publisher sections of several of the disciplines. If the Elsevier URL changes, a volunteer responsible for one discipline might notice and update the link on one page, while the older out-dated link lurks on the other sections. In a database configuration, the URLs of all publishers linked to the site would be entered into a database. The information would need to be corrected in only one location, more efficient than updating occurrences in several segments of the site. The addition of specialized databases to the web site might impact the structure of the web committee. Rather than a discipline-based division of responsibility, a committee member might take responsibility for updating the database of the web site's publishers' links. There are a wide variety of types and prices among the middleware offerings (King 1997). Some require a knowledge of HTML, while others assume familiarity with scripting languages. They range from CGI scripts, through add-ons to familiar packages (like Lasso working under FileMaker Pro), to elaborate commercial packages that support "shopping carts" and secure credit card transactions. It is currently SLA policy not to provide any proprietary web software, but the efficacy of dynamic data provision may eventually lead to the Association-wide adoption of a web database product. (A similar situation is SLA's selection of Quicken for use by all chapter and division treasurers.)

6. Step Four: Use of Information

"Use of Information," step 4, follows step 3 with no sharp delineation. To make the site contents most useful, the arrangement and presentation of the material must be logical. Design guides promote ". . . the idea of 'chunking,' which advocates grouping limited bits of information into similar categories so that the user can more easily process the overall information" (Stover & Zink 1996). Several disciplines have thesauri to help select appropriate terms and synonyms.² There is no reason to assume that various disciplines will have the

²See "Beyond Bookmarks" (www.public.iastate.edu/~CYBERSTACKS/CTW.htm) for links to controlled vocabularies in physics, mathematics, and others.

same “chunks.” Technical reports are a prominent document type in computer science; several specialized sites provide access. There is no exactly parallel category in astronomy. Astronomy has many sites of archived observational data, for which there are no close parallels in mathematics. And the section of web resources for librarians has its own singular pattern. Each section will require some unique categories, while many will share common types, such as dictionaries, journals, and directories. A “Reference Shelf” section linking to the best tools for each discipline would enrich the PAM site. Relevant web sites must be sought out and evaluated, then grouped for ease of use. Past experience with printed “Pathfinders” can combine with the wide access offered by the web to produce topic specific guides (Sloan 1996). Providing scope notes, dates, and source information will give links context. Any restrictions on the reproduction and distribution of site contents should be made clear to the users. Several Dublin Core elements can hold information on copyright ownership and use restrictions.

7. Step Five: Synthesis

“Synthesis,” defined as the organization and presentation of information from a variety of sources, is the fifth step in this model. In the context of the web, this includes both the total site design, and the currency of all links. Sites are never finished. Eternal vigilance is the price of freedom from dead links. Link rot, like rust, never sleeps. Kevin Hunt views the activity of site making as the Internet community’s form of “gift-giving.” He states “. . . in science, gift-giving takes the form of contributing journal articles for the sake of contributing to the growth of the community’s knowledge base and with the expectation of receiving recognition from the community in the form of citations and professional respect . . . This spirit of reciprocal gift-giving is central to the construction of ‘special interest’ sites” (Hunt 1996).

The ongoing development of the PAM site will require the coordinated efforts of enthusiastic volunteers. New resources must be discovered for each section. Established links must be monitored and updated. The presence of outdated links was the most common complaint about the site reported in the *PAM Division Strategic Planning Survey — February 1998*. Prior to the 1997 SLA Conference, it was decided that the site was too large for a single web manager. The PAM web committee was struck, with responsibilities distributed along discipline lines. Like the PAM web committee, members of the web development team of the Association for Educational Communication and Technology (AECT) discovered the difficulties of distributed web design and management. The AECT team reported, “While the ability to work with team members across a continent was exciting, the team also found this could cause delays in the development process . . . Lack of face-to-face contact proved to be particularly challenging. Misreading of intent resulted in miscommunications in e-mail messages . . . the transfer of information continues to be problematic. Currently the team is relying on a combination of FTP (file transfer protocol) and surface mail . . . with all updates completed via FTP.” The authors recommend a number of steps to facilitate web design by a dispersed group: establishing a time frame for

the overall project and deadlines for reviewing documents. And they caution, “Be prepared to devote extra time for distance management” (Hill et al. 1997).

The PAM web committee will be considering a thoroughgoing revision of the existing web site. But their enthusiasm for the newest web bells and whistles might be dampened by the important admonition to design to the lowest common denominator, that is, to design for those with the oldest flavor of browsers. Darcy DiNucci has identified three types of web users. The first group consists of those who seek out the newest options and will have installed the latest edition of their browser and the full range of plug-ins; the second group is made up of those who control their web browsers by customizing font settings, turning off graphics, etc.; and the third group is only interested in the content of the sites and will probably have older browsers. DiNucci suggests that only the first group is interested in design. The web designer’s efforts to include appropriate amounts of white space, to add killer animation or a new sound resource will only be appreciated by the first group. The other groups will prefer simpler or text-only options. Yet, the site must meet the needs of all three groups of users. By offering different paths through the same site, the needs of each group can be met (DiNucci 1997). Rather than trashing the earlier version, the site can grow by accretion. A splash sheet at the top of the web site can offer the user the choice of the text-only path or other routes, enhanced by frames, style sheets, and whatever is next. This approach allows more scope for innovative “early adaptors,” the most likely to volunteer for the web committee who want to test the newest features. A plug-in page should be maintained, with links to all extras needed to fully access the site. This page would include links to the browsers’ update sites, Adobe’s PDF download sites, and any other plug-ins that have been used in the site’s design.

8. Step Six: Evaluation

The last step of the “Big Six” is “Evaluation,” to judge the product and the efficiency of the information problem-solving process. In web design, this suggests the provision of feedback mechanisms, such as “mail to” links that facilitate communicating questions, comments, etc., to the web manager. A feedback form is another option, one often preferred by those whose browsers aren’t configured for email. With the right kind of publicity and the provision of an easy communications option, it may be possible to enlist all regular site users into the hunt for lapsed links. Counters can be added to a site to track usage numbers. Cookies are used by some sites to gather information on visitors, as are guest books and visitor registries, both less intrusive than cookies.

In the *PAM Division Strategic Planning Survey — February 1998*, members were asked to rate the PAM web site on a scale of 1–5, where 1 = good, 2 = pretty good, 3 = marginal, 4 = poor, and 5 = don’t know. One quarter of the respondents chose “don’t know” (5). They had not sampled the site enough to form an opinion. This survey was an excellent feedback mechanism. I hope that the PAM site will grow, change, and develop to the point that the next time such a survey is taken, the vast majority will select 1! Right now, the site is suffering from the “launch it & leave it” syndrome. If we want the PAM site to be a dynamic trove for astronomy librarians, the web site committee

must accept the charge of not only keeping the links live, but prospecting for and evaluating new links. All PAM members ought be encouraged to post interesting links to the listserv. The web committee should investigate and appraise posted links, and they should maintain a “link watch,” quarrying search engines for new offerings and posting them. A recent NEC Research Institute study reported that HotBot, the most comprehensive search engine, only covered 34% of indexable pages. Alta Vista covered 28%, Northern Light 20%, Excite 14%, and Lycos 3% (Edupage 5 April 1998), so multiple search engine sites must be regularly polled to ensure coverage. (It would be interesting to identify the proportion of overlap.) New links that meet the “web collection development policy” for the site can be permanently added. The others can be added to the site’s searchable “link watch” archive. This type of current awareness service provides a “value-added” leaven to the site and encourages repeat visits.

9. Conclusions

At this time, sixteen of the 37 SLA divisions and caucuses have web sites. In preparation for this presentation, I visited the web sites of the others. I was pleased to see that the PAM site was one of the more ambitious offerings. The PAM site essays to offer quality links in five areas: four scientific disciplines and library/information services, as well as supplying divisional and association connections. We share the discipline-specific links with our researchers, while the library/information links cluster, currently called “Web Workbench” is targeted at us as professional librarians. Here should be gathered links to help us maximize the benefits of the web, links to sites such as the UKOLN Metadata page (www.ukoln.ac.uk/metadata/), with the “DC dot” utility that automatically generates Dublin Core <META> tags. Like the other sections, the Workbench will need updating and enrichment to remain useful over time.

The PAM web site is over two years old. The start-up phase has concluded. Now, the potential of the medium must be more deeply explored and exploited, and a pattern of maintenance and renewal must be established to guarantee the site’s continuing value. The next edition is overdue. It behooves us to develop the organizational constructs to get the job done. We’re lucky this is a web site, not an architectural building site; it is much easier to refurbish. With the proper underpinning of member support and using the “Big Six” as a blueprint for addressing user groups’ information-seeking patterns, the PAM web site can function as a clearinghouse for astronomy librarians until web sites follow the gophers over the edge of the event horizon.

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