Search Engine Optimization for the Research Librarian: A Case Study Using the Bibliography of U.S. Latina Lesbian History and Culture

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Search Engine Optimization for the Research Librarian: A Case Study Using the Bibliography of U.S. Latina Lesbian History and Culture

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Abstract

Higher website rank among search engine results is correlated with higher site visit numbers. Studies have repeatedly demonstrated how important it is to a site's visibility and popularity to appear in the first page of search results for a given query. Librarians and researchers, long seen as creators and providers of high-quality content, now see our own web-based materials in direct competition for the higher-ranked slots for many keyword searches. For certain areas of research - sexuality studies in particular - websites with relevant informational or scholarly content have been nudged out of the top rankings by content that is not only unrelated to a variety of search term combinations but quite often consists of explicit pornography. Nowhere is this more obvious than in ethnic lesbian studies. It is therefore necessary for scholars and librarians who put ethnic lesbian sexuality studies content on the web to assign high quality metadata and to format their content appropriately in order to receive a visible rank in search engine results for these sexuality studies research keywords. Using the author's "Bibliography of U.S. Latina Lesbian History and Culture" as an example, this case study investigates how librarians and other researchers can prepare online bibliographies to take advantage of search engine optimization (SEO) techniques and therefore see enhanced visibility for these resources in search engine results. Search engine optimization techniques were applied to the bibliography and significant improvements in site visibility in Google searches for targeted keywords were observed.

Keywords: search engine optimization, SEO, research dissemination, Google, web crawlers, search engine algorithms, sexuality studies, Latino studies, lesbian studies

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Background

In July 2012 alone, over 17 billion searches were conducted through search engines rather than through direct access via the URL or following a link from another website (comScore, 2012, para. 3). Furthermore, higher website rank among these search engine results is correlated with higher site visit numbers: studies have repeatedly demonstrated how important it is to a site's visibility and popularity to appear in the first page of search results for a given query (Jansen & Spink, 2006; Enge, Spencer, Stricchiola, & Fishkin, 2012). As Michael Evans (2007) notes in his article analyzing Google search results, "search engines may return many millions of documents for each user query, but the user only looks at a select few" (p. 21). Librarians and researchers, long seen as creators and providers of high-quality content, now see our own web-based materials in direct competition for the higher-ranked slots for many keyword searches. As Enge, et al. (2012) note in their book *The Art of SEO*, "visibility in search engines creates an implied endorsement effect, where searchers associate quality, relevance, and trustworthiness with sites that rank highly for their queries" (p. 259).

For certain areas of research, sexuality studies in particular, websites with relevant informational or scholarly content have been nudged out of the top rankings by content that is not only unrelated to a variety of search term combinations but quite often consists of explicit pornography. Web-based research in ethnic lesbian sexuality studies in particular is difficult given the large number of spammy and pornographic results that appear in the top 100 results of all major search engines for a variety of searches. While this amounts to little more than an annoyance to the average academic researcher, it is problematic for less savvy internet searchers and it can be argued that it reflects an inefficiency in current search engine result page (SERP) rankings.

As of the beginning of this project in early 2011, every single result on the first page of unfiltered results (safe search turned off) for the Google search "latina lesbian sexuality" or "hispanic lesbian sexuality" was a link to a pornographic website. Similarly, a search for "Asian lesbian sexuality" also resulted in a high percentage of pornography websites in the top pages returned. By comparison, none of the top 10 results for the searches "latina sexuality," "hispanic sexuality," "latino sexuality," or "lesbian sexuality" were for pornographic content. Undoubtedly, the pornography industry has been very successful in optimizing search results for the most basic descriptive terminology for ethnic lesbians.

While it is perfectly reasonable to expect to see pornographic content when searching for terms such as "sex" or "pornography" in addition to the terms used above, it is unexpected

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and less than optimal to see these results for searches of generally accepted sexuality studies vocabulary. One of the explanations for this phenomenon is that Google's algorithm provides results for what it considers to be related terms (Enge et al., 2012) and results using the word "sex" are commonly returned for searches using the word "sexuality." In the past, searchers could put the + sign immediately before a specific word they'd like to see returned exactly as written. However, with the advent of Google+, that feature has been discontinued. Currently searchers must put single words in quotation marks to get results for exactly that word. A searcher would have to type "sexuality" in quotes to see only results containing that word rather than the word "sex." Studies have shown that the average web researcher has little knowledge of this type of advanced search strategy (Holman, 2011).

Assal and Harwood (2007) argue that search engine algorithms in effect "perform … a gatekeeping role online" for the information produced by minorities at risk (p. 4). It is therefore necessary for scholars and librarians who put ethnic lesbian sexuality studies content on the web to assign high quality metadata and to format their content appropriately in order to receive a visible rank in search engine results for these sexuality studies research keywords. Researchers in sexuality studies need to learn how to optimize their own websites and publications in order to receive higher and more appropriate visibility in the age of the search engine.

Since 2009, I have been compiling an academic bibliography on Latina lesbian history and culture with the plan to put it on the web when it had grown large enough to be of use. In November 2010, I put my initial bibliography, "U.S. Latina Lesbian History and Culture," onto the web, using the free web hosting I had been granted as an NYU affiliate. The website is located at https://files.nyu.edu/mg128/public/Lesbian.html. I decided to conduct a case study using the page to investigate how librarians and other researchers can prepare online bibliographies to take advantage of search engine optimization (SEO) techniques and therefore see enhanced visibility for our resources in search engine results. My ultimate goal was to see my bibliography in the top 10 results for a variety of relevant keyword searches in Google but most specifically for a search for "latina lesbian." Before outlining the case study methodology and results, I'll first provide some background information on SEO.

What is Search Engine Optimization (SEO)?

There are a variety of definitions of SEO in the academic literature. Sometimes SEO is defined as the for-profit industry that has popularized search engine visibility strategies:

> Away from the research establishment, a new industry has emerged called Search Engine Optimization (SEO), which seeks to determine the most important factors to be used to get a high ranking, and then apply those factors to a client's web site for a fee. (Evans, 2007, p. 23)

However, the more generally accepted definitions involve the actual techniques used by web content creators to increase visibility of web-based resources:

> "Organic search engine optimization (SEO) is a process of constructing and amending sites to map to the functionality of search engine technology so that sites can appear higher in the results set for client search terms and phrases" (Sweeny, 2007, p. 36).

> Search Engine Optimization (SEO), or search engine positioning, is the process of identifying factors in a webpage which would impact search engine accessibility to it and fine-tuning the many elements of a website so it can achieve the highest possible visibility when a search engine responds to a relevant query. Search engine optimization aims at achieving good search engine accessibility for webpages, high visibility in search engine results, and improvement of the chances the webpages are retrieved (Zhang and Dimitroff, 2005, p. 666).

> Search engine optimization is the practice of improving a site's ranking on search result pages and also increasing target traffic to a Web site. Broadly speaking, SEO activities include adhering to accessibility standards, providing descriptive HTML title tags and metatags, creating search engine-friendly text, and ensuring the site architecture allows for easy indexing by search engines (Rushton, Kelehan, & Strong, 2008, p. 526).

Although *The Atlas of New Librarianship* (Lankes, 2011) includes SEO only in a section about PageRank's drawbacks (p. 60), this seems fairly narrow, especially since search engines themselves publish guides for optimizing websites (Bing, n.d.; Google, 2010; Yahoo!, 2010). A search engine has a clear interest in assuring that the most relevant sites for a particular query appear at the top of the results list. These guides explicitly state that relevant search result outcomes require high quality metadata that is readable by their web crawlers. On Google's own

Webmaster Central Blog, the "Starter Guide to SEO" is described as "a list of best practices that we use inside Google that you might want to check out" (Falls, 2008, November 12). Yahoo!'s style guide for SEO notes, "Good SEO copywriting makes your page more readable for both search engines and humans" (Yahoo!, 2010). It seems clear that properly done SEO improves search results through increased accuracy and relevance and should be viewed as a set of best practices for librarians and other researchers to consider when preparing the content we put on the open web.

This is not to say, however, that all SEO is done appropriately. In fact, as Cahill and Chalut (2009) and many others note, there are a number of unethical, "black hat" SEO techniques designed to elevate poor quality or non-relevant web content to an undeservedly high rank for targeted search queries. These techniques, which include link farms, invisible text, and inaccurate or misleading metadata, lie outside the scope of this article, as do campaigns such as "Googlebombing," which have been undertaken by end users to influence search results, usually for the purposes of political statement or humor (Bar-Ilan, 2007). Also excluded from this analysis are paid SEO techniques such as sponsored listings and other paid placements such as those enumerated in the Federal Trade Commission's 2002 Consumer Alert "Being Frank about Search Engine Rank."

Why Should SEO Matter to Academic Librarians?

Good SEO is about the accessibility of our work and resources. A newer subfield called Academic Search Engine Optimization helps scholars learn how search engines like Google Scholar include and display content in ways that are different from regular search engines. Google Scholar is very particular about how it includes content – preparing and displaying your documents with good SEO in mind will help web crawlers find your scholarly work and include it. It also gives librarians an opportunity to instruct teaching faculty on how to make their scholarly work more visible.

Additionally, as open access gains credibility, making articles and bibliographies easy to find on the web is essential. Even EDUCAUSE has gotten on the SEO bandwagon with articles like "Intentional Web Presence: 10 SEO Strategies Every Academic Should Know," by Patrick Lowenthal and Joanna Dunlap (2012, June 6). As they note:

> Increasingly, we work in a "Google World." What this means in practice is

> that if Google (or other popular search engines) cannot find your work or the work of your colleagues, department, or institution, then it is essentially irrelevant - dare we say, nonexistent - because people will not find, read, apply, or build on the work if they cannot locate it via a quick Google search.

It seems clear, then, that SEO practices should be embedded into the way we create, format, and display our written work in the academic world.

Case Study in Search Engine Optimization for the Bibliography of U.S. Latina History and Culture

Project Goals

As in the Rushton, et al., (2008) pilot project, goals for the optimization project included:

1. Increasing the search engine result page (SERP) placement of the bibliography for a set of targeted keywords.
2. Increasing the number of search engine referrals.
3. Increasing the number of page visits.
4. Increasing the number of unique visitors.
5. Increasing the number of inbound links to the bibliography site.

Methodology

The methodology for this test project follows the phase timeline established by Rushton, et al. (2008):

Phase 1: Keyword research and baseline measurements.

Phase 2: Optimization.

Phase 3: Post-optimization analysis.

Phase 1: Keyword Research and baseline measurements

Targeting keyword strings for optimization

Successful SEO requires substantial keyword research informed by aggregate search data. It is important to carefully choose the terms for which you'd like to optimize the site to avoid targeting an inappropriate keyword string, for example, or to avoid attempting to target

a keyword string that is already very competitive in terms of the search volume and for which there already exists a number of highly optimized sites with relevant content.

Fortunately, there are a number of tools to help determine the competitiveness of keywords, tools that help determine the keyword richness of websites and documents, and tools that display keyword search volume by region. It is ideal to use all of these tools together to help develop a better understanding of which keywords are appropriate for targeting with SEO techniques.

First I brainstormed a list of keywords related to the "Bibliography of U.S. Latina Lesbian History and Culture." Wishing to expand on this list or discover some keywords I may have missed, I turned to the free web-based tool Topicmarks (http://topicmarks.com/). Topicmarks, which was acquired by the company Tagged and subsequently discontinued in July 2012, was a service that purported to summarize the contents of a website or document and highlight the most important sentences. It could also be used to generate a list of frequently appearing words in a given document, displaying keyword density for a variety of terms that could then be targeted. I used the service to supplement my initial list of keywords for potential optimization.

Google Adwords Keyword Tool (https://adwords.google.com/o/KeywordTool) is another way of generating a list of keywords. Although it was developed to serve website owners looking to take advantage of paid search advertising opportunities, it is worthwhile for organic search optimization as well. For example, the faceted searching option allows you to identify search terms related to a given term, narrowed by broader topic. I used the tool to discover terms related to the bibliography under the category "Teaching & Classroom Resources." The tool also displays the number of monthly searches for each term and if the term is competitive or not.

Armed with a lengthy list of potential keywords for optimization, I moved on to determining the global search volume for these keywords. Google Trends (http://www.google.com/trends) is a tool that displays a search volume index for a chosen keyword or string. You can display volume over time and compare it with up to five other keyword strings. This tool helps determine if your targeted keyword strings are already heavily searched. High volume searches tend to be more heavily optimized already, and a librarian or scholar looking to optimize his or her site may want to choose other, less competitive searches, such as a long tail keyword string.

Next I used Google Insights for Search (http://www.google.com/insights/search), which deepens the information provided by Google Trends by adding dimensions such as categories, seasonality, geographic distribution, and other properties.

Ultimately I chose the following list of keyword strings for optimization, recognizing that the terms marked with an * would be more difficult to optimize.

- Latina lesbian research
- Latina lesbian research site:.edu
- Latina lesbian bibliography
- Latina lesbian history
- Researching Latina lesbian history
- Latin American lesbian research
- Latin American lesbian research site:.edu
- Latin American lesbian bibliography
- Library research Latina lesbians
- Latina lesbian sexuality
- Latina lesbian studies
- Latina lesbian culture
- Latina lesbian*

I didn't choose to optimize and measure for related terms such as "Hispanic" or "Chicana" during this particular case study, but as can be seen from the Phase 3 results, Google considers them to be closely related enough to send a good deal of search traffic to the bibliography page for those keywords as well.

Taking a baseline measurement for the targeted keywords

Once I had the list of targeted keywords, I measured SERP placement of my bibliography for each keyword string. I only noted if the bibliography appeared in the top 100 results, recognizing that very few search engine users ever go beyond a couple of Google results pages. Measurements reflect SERP with all customization features of Google disabled and all browser settings set to continually erase search history and disallow cookies. However, it was impossible to disable the regional search customization that Google returns based on computer IP addresses. All measurements were observed through browsers on computers located in Manhattan. The initial measurements are displayed in figure 1.

Each Google SERP Placement number reflects the position in which the bibliography was displayed as a search result. So a placement of "12" for the keyword string "latina lesbian history research" reflects that the bibliography appeared as the second result on the second page of a Google search for that keyword string. Note that the site's natural ranking equilibrium

happens to be very high in the rankings (on first page of Google results) for many of the keyword searches I had chosen for this case study. This is most likely because the document itself is very keyword rich and because it was hosted on a .edu domain, both considerations weighted highly by the algorithm. SEO techniques proved to be unnecessary for many of the terms I had targeted.

Figure 1: The bibliography's pre-optimization placement in Google searches for each targeted keyword string.

Term	Google SERP Placement 2/13/2011	Google SERP Placement 4/8/2011
latina lesbian research	not in top 100	not in top 100
researching latina lesbians	not in top 100	not in top 100
latina lesbian research nyu	1	1
latina lesbian research rutgers	5	5
latina lesbian research site:.edu	7	11
latina lesbian bibliography	6	3
latina lesbian history	17	4
researching latina lesbian history	not in top 100	not in top 100
latin american lesbian research	not in top 100	not in top 100
latin american lesbian research site:.edu	not in top 100	not in top 100
latin american lesbian bibliography	not in top 100	not in top 100
library research latina lesbians	not in top 100	not in top 100
latina lesbian "sexuality" (restricts to full word only, not variations)	not in top 100	not in top 100
latina lesbian "sexuality" research	not in top 100	not in top 100
latina lesbian studies	15	12
latina lesbian studies research	not in top 100	not in top 100
latina lesbian	not in top 100	not in top 100
latina lesbian culture	13	6

Phase 2: Optimization

Adding link architecture

To give some additional information to search engine web crawlers about the contents of the site, I added an internally linked table of contents (TOC) to my bibliography. Internal and

anchor links are recognized as an important factor in Google's algorithm, making a linked TOC an important addition to any document, especially if there is no top or side-level navigation on the page. It is also important because Google's algorithm privileges content that is placed higher on the page when determining page contents. As Matt Cutts, head of Google's Webspam Team put it during the 2007 WordCamp conference, "If you can get the keywords closer to the title … that helps a lot" (Cutts, 2007). With a bibliography, the top-most content may simply be closer to the beginning of the alphabet but not necessarily more indicative of the entire contents of the document. Having a table of contents with anchor text that links to relevant portions of your document will help tell the search engine what your document is about with greater accuracy.

Adding metadata

I inserted the following keywords and additional targeted text into the <head> section of the bibliography's webpage HTML:

> <meta name="description" content="Resources for the study of Latina lesbian history and culture. A comprehensive bibliography of published works, archives and audio-visual resources.">

This section is the little text blurb that displays underneath a listing in a search engine. I chose to add this portion to the bibliography because, although the actual ranking of the page will not be affected through alterations of the description tag, "it nonetheless plays a key role, as search engines often use it as a part or all of the description for your page in search results. A well-written meta description can have a significant influence on how many clicks you get on your search listing, so time spent on meta descriptions is quite valuable" (Enge, et al., 2012, p. 150). Editing this portion of the HTML was done to further Project Goals 2 through 5.

> <meta name="keywords" content="latina lesbian history and culture, lesbian studies, latina lesbian research resources, latino studies, queer studies, gay studies, hispanic american lesbian studies">

This section of metadata has been widely abused by black hat SEO practitioners. Researchers who track changes to the Google algorithm have noted that it has recently been downgraded in importance (Enge, et al., 2012). Nonetheless, it remains a factor used by web crawlers to help determine the content of your website.

Submitting the bibliography page URL to Google's Webmaster Tools

If your website has not been crawled by Google's web crawlers, you can submit the URL through Google's Webmaster Tools site, requesting that it be crawled and included in Google's index (https://www.google.com/webmasters/tools/submit-url?pli=1). I submitted the bibliography's URL at the beginning of 2011.

Phase 3: Post-Optimization Measurements

As in Phase 1, measurements were taken for SERP placement for all targeted keyword strings. The results are displayed in figure 2.

Figure 2: The bibliography's post-optimization placement in Google searches for each targeted keyword string.

Term	Google SERP Placement 5/24/2011	Google SERP Placement 9/27/2011
latina lesbian research	19	13
researching latina lesbians	16	16
latina lesbian research nyu	1	1
latina lesbian research rutgers	3	5
latina lesbian research site:.edu	10	9
latina lesbian bibliography	3	1
latina lesbian history	1	1
researching latina lesbian history	2	1
latin american lesbian research	84	38
latin american lesbian research site:.edu	42	19
latin american lesbian bibliography	5	4
library research latina lesbians	3	1
latina lesbian "sexuality" (restricts to full word only, not variations)	18	19
latina lesbian "sexuality" research	24	26
latina lesbian studies	2	4
latina lesbian studies research	1	4
latina lesbian	not in top 100	20
latina lesbian culture	1	4

Clearly the optimization techniques applied to the page in Phase 2 bore fruit. The rankings are significantly higher for almost all targeted search strings. Notably, the bibliography was appearing on the second page of Google results for the search "Latina lesbian," a search for which the overwhelming majority of other results were pornographic in nature.

Visitor Statistics

At beginning of project, the majority of site visits were referred by long search strings usually involving a specific citation for a work included in the bibliography, for example:

> queering the painted ladies: gender, race, class and sexual identity at the mexico border in the case of the two paulas
>
> tijerina-revilla. "are all raza womyn queer? an exploration of sexual identity in a chicana/latina student organization." nwsa journal 21.3 (2009): 46+. literature resource center. web. 7 mar. 2011.

Typical examples of Google searches leading to the page are displayed in Figure 3.

> **Feb 13 2011-Apr 8 2011 (phase 1)**
> **63 total page visits, average of 1.1 per day. 44 unique visitors, average of .8 per day. 40 search engine referrals, average of .74 referrals per day.**

Figure 3: Phase 1 Visitor Statistics

Top Keyword Referrals During Phase 1
queering the painted ladies: gender, race, class and sexual identity at the mexico border in the case of the two paulas
"journal of gay & lesbian social services" "romo-carmona"
albuquerque cvi "victoria ortiz"
anito xtravaganza, keith haring, and queer latino testimonio
carmen vasquez feminist new york 2011
de colores gay organization
emily perez north brunswick nj
experiences regarding coming out to parents among african american, hispanic and white, gay, lesbian bisexual, transgender and questioning adolescents.

Towards the end of the study and continuing to the present day, although the above types of searches still drive limited traffic to the bibliography, a significantly higher percentage of the referrals from Google searches come from keyword strings that were targeted for optimization, for example:

- latina lesbians
- mexican lesbians
- hispanic lesbians
- latina lesbian history
- latina lesbians in history
- chicana lesbian history

Typical searches are shown in Figures 4 and 5.

May 25-Sept 27 2011 (phase 3)
275 total page visits, average of 2.1 per day. 225 unique visitors, average of 1.7 per day. 206 search engine referrals, average of 1.4 referrals per day.

Figure 4: Phase 3 Visitor Statistics

Top Keyword Referrals During Phase 3
latina lesbian
black south african lesbians discourses on motherhood and women's roles pdf
latin lesbian
latina lesbian culture
latina lesbian history
lesbian 3a-melia
lesbian latin women
lesbians latinas

January 1 - December 31, 2011
1028 total page visits

Figure 5: Visitor Statistics for 2011

Top Keyword Referrals for 2011
latina lesbian
latina lesbians
mexican lesbians
lesbian latina
hispanic lesbians
latin lesbian
latino lesbian

Search engine referrals

The average number of search engine referrals per day during Phase 3 was a 189% increase over the average number of search engine referrals in Phase 1. See Figures 3 and 4.

Unique Visitors

The average number of unique visitors per day during Phase 3 was a 212% increase over the average number of unique visitors per day during Phase 1. See Figures 3 and 4.

Inbound links

The total number of inbound links in Phase 1 was zero. At the end of Phase 3, the number of inbound links was 22. Although this appears to be a positive development, the majority of sites linking to the bibliography are spam or black-hat sites that scrape the web to include other content on their own pages. Only three of the inbound links are from legitimate websites with content relevant to the bibliography. This is a development to keep an eye on as one of the more recent Google algorithm updates downgrades website rankings for having too many spammy inbound links (Cutts, 2012, July 27).

Discussion of Results

As has been demonstrated through the data collection, even very basic search engine optimization techniques corresponded with a significant increase in visibility of the online bibliography. Following optimization, increases were observed in the total number of bibliography visits, the number of inbound links to the bibliography, SERP placement, and

most importantly the number of Google search referrals for the targeted keyword search strings.

Another interesting find was that, while some of the targeted search strings resulted in very high Google SERP placements, they were responsible for very few referrals to the bibliography. This indicates that few people are searching for these terms to begin with, and it calls into question the assumptions I had about the potential users of my site. Perhaps I was thinking more from the perspective of a librarian than a user, forgetting that users are not likely to search for the sorts of controlled vocabulary that I targeted. It's also possible that those researchers who would think to use the controlled vocabulary are using more specific databases rather than searching these terms on the open web. In either case, it is an important reminder that when we are providing access points to our work, we should keep in mind that the web is searchable by everyone, not just academics who may have more experience with controlled vocabulary. SEO practices by librarians and scholars must include folksonomy tags in order to gain top search positions and traffic.

Limitations to the Case Study

Although the Phase 3 results showed remarkable improvement in site visibility and visits, there were several limitations to the case study:

1. Single page optimization. SEO is a set of practices designed for entire sites with page hierarchies, and there is only so much you can do with a single page. More effective optimization could have been applied if there were more pages in the site.
2. Google search customization. It is hard to know how to optimize a site when Google's search customization options mean that everyone sees a different set of results for the very same search. These results change based on whether or not a searcher's website history is turned on in their Google account, their location, and other preferences.
3. Leaving the page untouched throughout study. A 2011 Google algorithm update added preference for fresh content, meaning that the bibliography might have fared better in the rankings had I continued to add content throughout the study (Schwartz, 2011, November 3). The measured SERP placements for the bibliography have not remained as high as they once were as I have not added new content to the bibliography since February 2011.
4. This case study optimized only for Google results, and did not take metrics for

Yahoo! and Bing into consideration.

5. Google Analytics records only keyword referral data for some, but not all, visitors. This meant that there were significant numbers of visitors to the site for whom I had no keyword referral data.
6. It is unknown how much impact previous searcher behaviors have had on Google's algorithm. It is therefore also unknown how the SERP placements for the bibliography are the result of previous visits by searchers who used the terms "latina sexuality" who actually were looking for pornography and ultimately remained on a pornographic site.
7. The URL of the bibliography was nondescript. I deliberately used such a generic URL to host the bibliography in an attempt to minimize any positive effect the page might have received in rankings through a more descriptive URL as the study was concerned only with measuring the SERP change resulting from other factors such as metadata enhancement.

Future Areas for Improvement

W3C Compliance

It has been noted by many that web standards compliance is not one of the factors considered by Google's ranking algorithm. However, page load time is a factor (Singhal & Cutts, 2010, April 9) and W3C compliant pages may have a faster load time. I checked my bibliography with the Markup Validation Service provided by W3C (http://validator.w3.org) and found a number of coding errors that should be cleaned up for better web readability. Saving a Word document in HTML format is insufficient to create clean W3C compliant code.

Additional Site architecture

Because site hierarchies are one of the ways in which Google's algorithm determines how to display your page in search results (Ohye, 2008, October 6), one of the first changes to be made to the bibliography would be to develop the site's architecture through the addition of nested pages with related content. For example, each section of the bibliography could be placed on a different page with a uniform site-wide navigation bar.

Other Search Engines

This bibliography was optimized with only Google in mind, and, consequently, very few visits were referred by Yahoo! and Bing throughout the length of the study. This project could be expanded using the trade industry information on Bing and Yahoo! algorithms and also those search engines' own SEO guides.

General Best Practices for SEO

These best practices have been compiled from sources included in the bibliography of this article, especially Google (2010), Beel, Gipp, & Wilde, (2010), Kritzinger & Weideman (2007), Sweeny (2007), and Enge, et al. (2012).

- Include important subject keywords in your article title, abstract, and HTML metadata tags.
- Keep titles relatively short.
- Assign good metadata to any uploaded PDF files, especially author and paper title names.
- Use machine-readable vector images so that search engines can index the text used in charts and graphs.
- Format articles with standard terminology: Introduction, Literature Review, Results, Bibliography, etc. This is particularly important for indexing in Google Scholar.
- Publish in an open access journal.
- Upload articles to your institution's repository, departmental webpage, or personal webpage.
- In your overall site structure, put the most important pages higher in the site's architecture.

Conclusion

With this case study I have demonstrated how straightforward it can be to achieve significantly higher search engine rankings for high quality, keyword rich content such as the bibliographies that librarians typically produce. However, search engine optimization is an ongoing activity. While large initial successes were observed, some of the higher rankings attained by the bibliography have since diminished given no new content has been added to the bibliography nor have any additional SEO techniques been applied since Phase 2 of this study.

Anyone who chooses to use SEO techniques for his/her own work must keep this in mind and stay current on algorithm changes of the major search engines and the kinds of search engine keyword referrals that are bringing users to their websites. Given the growing popularity of web search by our patrons, it is incumbent upon librarians to stay abreast of these developments and revise our own web-based resources accordingly in order to remain visible among the less reliable sources that are currently earning higher rank in search engine results.

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